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STEEL

The Magazine of Metalworking and Metalproducing

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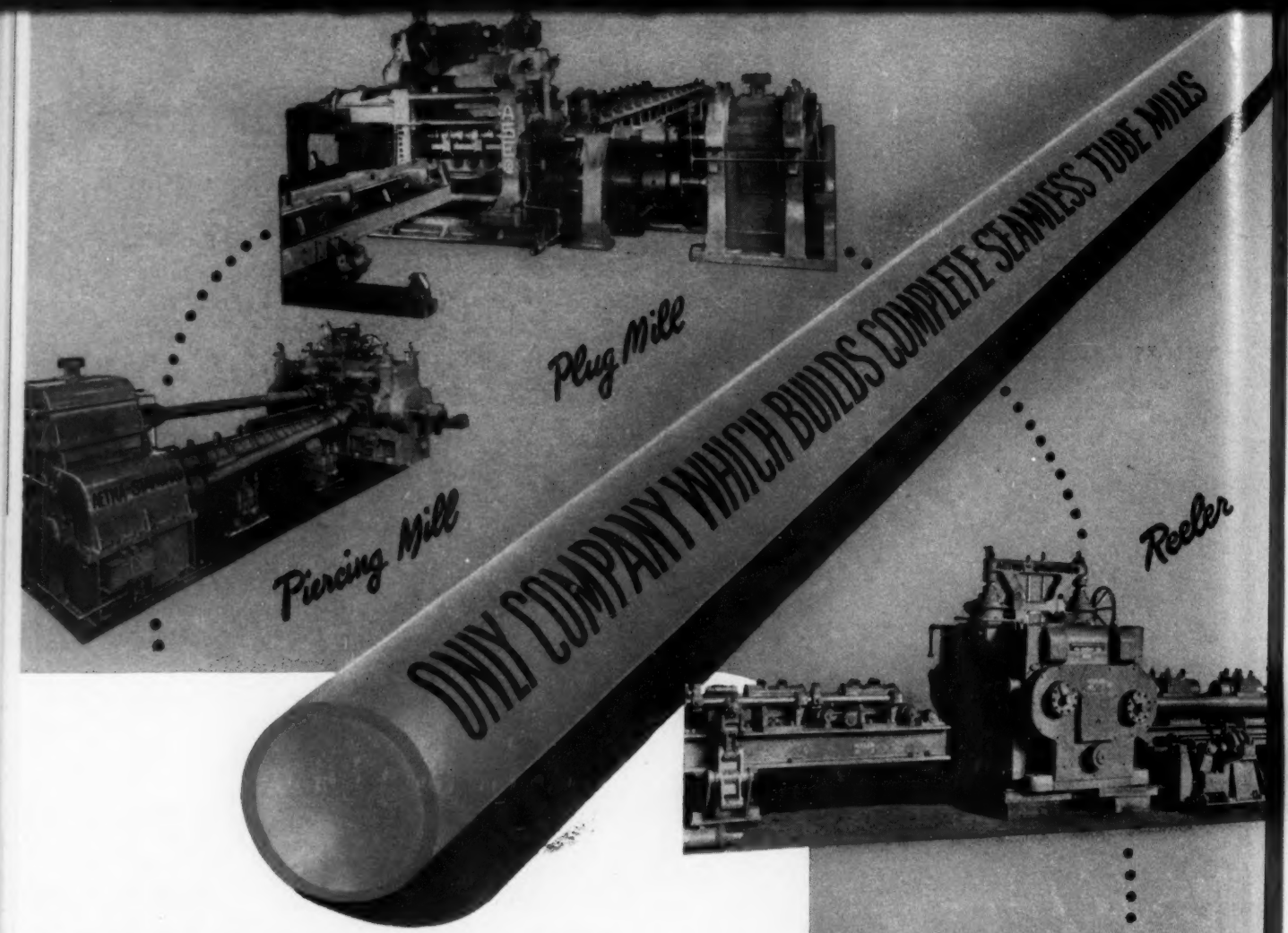

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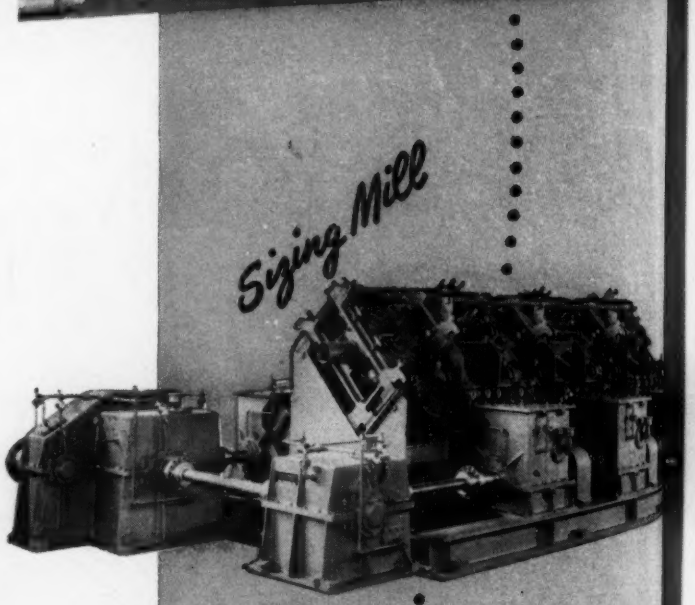

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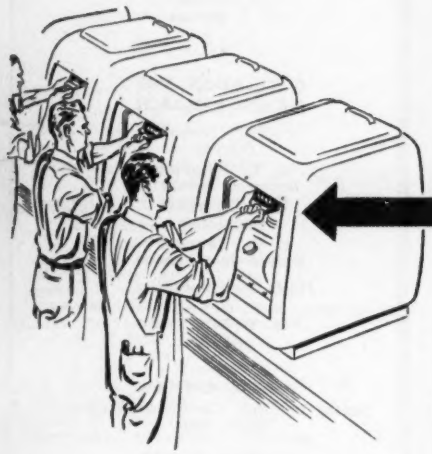

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Behind the Scenes...

Flowers & Steel

We never thought it would really happen—or if it did, that no mayhem would result. And while we don't doubt the veracity of the source, we regret that we weren't on hand to see it. Anyhow, we can report that a man walked through a Chicago steel plant wearing an *orchid* and lived to tell the tale! John Knox, our steel plant editor, reports it, so it is undoubtedly true. He also told us the man's name, which we will repeat to you on the promise that you keep it in confidence. It was Arthur McKee, who knows quite a bit about steel plants. Wonder how many wolf whistles he got from the open hearth gang.

Bits from Over the Seas

Among our international mail are a couple of items worth mentioning. From Vincent Delport, manager of our European operations, comes a note telling us that he has a subscriber whose name he can't discover, although he has no doubt as to the occupational classification of the gentleman. All he has is a number, because the address is in care of His Majesty's Prison in a British town. On the other side of the fence comes a letter from a man in Japan, whose name we know but whose activities were in doubt. Mr. Yoshio Ogawa says our publication is highly regarded in Japan, and by his company, the Fuso Metal Industries. Wonder if that Fuso has anything to do with the results of the atomic bombs?

Five Decades Ago

Our issue of May 4, 1899, must have been an extremely interesting one at the time, and it is still interesting in retrospect. Center of the stage was held by rumors of a giant consolidation, and the editors of our sheet secured definite denials that anything of such nature would happen. "The whole report," says the lead editorial, "can be safely discredited." The companies mentioned or their successors are all important members of the family of United States Steel today. Another important story that week was the full page obituary of Captain Alfred E. Hunt. "It would be difficult to say," says the obit, "whether Capt. Hunt was best known as commander of the famous Hampton Battery B, or as the founder of the Pittsburgh Reduction Co." Time has certainly given us the answer to that one. Few people remember anything about that military group, but nearly everyone is familiar with the industrial giant whose name has been changed from Pittsburgh Reduction to Aluminum Co. of America.

Reading Readers

Another batch of certificates are on their way to acknowledged readers of this column. If you read this stuff, you can be sure that you are in good company. Nearly everyone who has admitted reading it so far shows every indication of a superior being. Some can even write, while very few have more than one head. This constantly worries our editors, because until recently they felt the intelligent people of this industry read *their* stuff. Ever since they found out that 205 people read this column every week, they have redoubled their efforts to bring an even better bill of reading fare to the editorial section. Looks like they've succeeded too. At least, in the case of the insurance and pension fund article, we have had to re-reprint to take care of the demand for extra copies. Readers Service reports they are now nearing the 10,000 mark, with orders still coming in from all over the country.

Puzzle Corner

First answer we received to the problem of Sally's age was 76 years, which was wrong. That one doesn't count, because it came from one of our own people who saw the book before it was mailed to you readers. The correct answer is 22 years and 8 months. From the engineers of Page Steel & Wire, Monessen, Pa., which is on the Monongahela river, comes a problem which they have probably answered by testing it out. A man in a rowboat leaves a good fishing spot in a river and rows upstream for one mile, when his hat blows off. He continues rowing for ten minutes, then decides to get his hat and turns around to row downstream. He catches his hat (still floating) just where he was fishing at the beginning of this tale. How fast was the stream flowing and how fast can the man row?

Shrdlu

(Editorial Index—page 45)

STEEL

Vol. 124—No. 18 May 2, 1949

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STEEL

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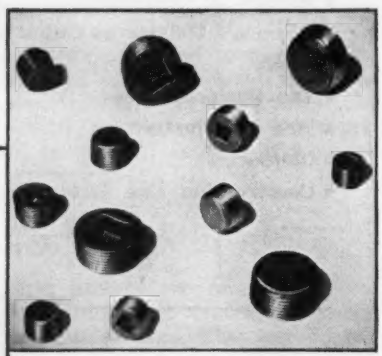
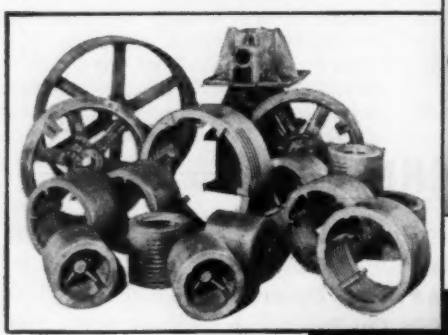
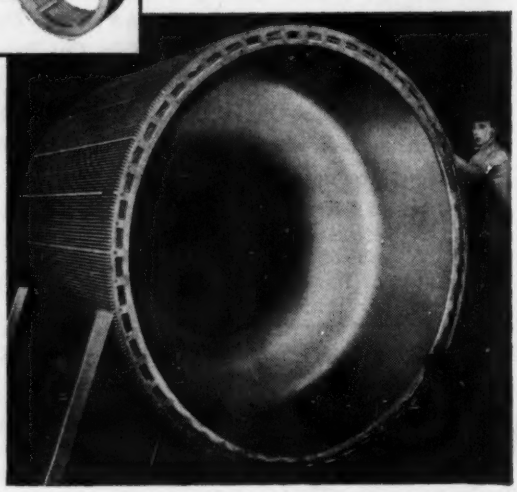
SMALL CASTINGS: Pipe plugs cast in Ni-Resist to defeat corrosion . . . prevent sticking. An example of small size Ni-Resist castings adapted to quantity production by jobbing foundries. →





***MEDIUM* CASTINGS:** Free from tendencies to corrode, comminutor parts cast in Ni-Resist lengthen life of sewage disposal equipment.



***LARGE* CASTINGS:** Filter wheel weighing several tons cast in Ni-Resist prevents contamination of first quality caustic and resists thermal shock.

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May 2, 1949

Stymies Industry

Decisions of the Supreme Court on basing point pricing in the sale of rigid steel conduit and on the Inland Steel case relative to collective bargaining on pension plans provide two clear cut illustrations of how opinions of the highest court can lead to situations under which industry cannot operate effectively.

Industrialists—consumers as well as producers—had hoped that the Court's decision in the steel conduit case would help dispel the uncertainty that has prevailed for months as to what constitutes legal pricing methods. The 4 to 4 decision handed down last Monday does nothing to clarify the situation and, as the nation's industries proceed farther into a highly competitive buyers' market, the absence of any understandable ruling as to what pricing is permissible is going to cause real hardship. It is unfair to ask sellers to assume risks because the meaning of the law is not clear.

In refusing to review a decision by the Circuit Court of Appeals in the Inland Steel case, the Supreme Court confirms earlier rulings by the National Labor Relations Board and lower courts to the effect that pension plans are subject to collective bargaining. Hundreds of specialists who know what is involved in working out satisfactory retirement income programs for employees hold that these complicated agreements are not negotiable in the manner that wages are negotiable. The subject is so technical that to obtain accord among management, attorneys, the Internal Revenue Bureau and the bank or insurance company handling the program is exceedingly difficult. To further inject the claims of one or several unions into the picture will make honest agreement practically impossible.

Undoubtedly there are sound, practical means by which pricing systems and pension plans can be arrived at legally but these means cannot be ascertained from the rulings of the Supreme Court. Consequently it would seem that if we are to have laws which will work and can be understood, Congress must write new ones.

These laws should be written in language which, when interpreted by the courts, will mean exactly what Congress intends them to mean. At this stage, Congress apparently is the only body that is capable of clearing away the utter confusion which now stymies industry.

* * *

COAL'S FUTURE BRIGHT: Seventh in this publication's series of articles on fundamentals of steelmaking is a treatise on "Production of Metallurgical Coke and Resultant Coal Chemicals." The author, Philip S. Savage, vice president of Donner-Hanna Coke Corp., is optimistic in regard to the future of the coke oven industry.

He points out that restrictive government policies prevented the industry from expanding as much during World War II as it did during and following World War I. However, he says that more recently "greatly increased demand for gaseous fuel, the high price of fuel oil and the greatly expanded demand for coal chemicals and ammonia are gradually correcting" the situation. "The severe shortage of metallurgical coke and poor quality of much that is available have offered an incentive to build new ovens that has resulted in the planning and actual construction of more new ovens in 1948 than have been built for many years."

Mr. Savage believes that "within the lifetime of the average 1948 college graduate the carbonization of coal and its synthetic products will be carried on by an industry that will rival the

(OVER)

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great steel and petroleum industries of today. Coal must be the future source of most of our liquid and gaseous fuels. Coke oven trained men will be ideally fitted for this industry."

This is a highly significant prediction and one that is likely to be proved true by developments of the next few decades. —p. 94

* * *

ACCENT NOW ON SALES: Keynote of the Triple Mill Supply convention held in Cleveland last week was that selling has replaced producing as the No. 1 job of 1949 and that for the remainder of the year and for several years thereafter industry's output will be limited to that which its salesmen can sell. As one speaker phrased the problem, the challenge that is being placed before American manufacturers and distributors is to "get sales, while at the same time reducing distribution costs through more effective selling."

Interesting in this connection was the request by the northern group of distributors to their manufacturers to consider: Better packaging and labeling of product, restoration of 2 per cent cash discount, prepayment of freight charges, simplification of discount systems, better selection and training of factory representatives, closer attention to informing distributors of impending price changes and restraint in appointment of distributors in a given area.

Most of these are timely and worthy of careful consideration. —p. 56

* * *

FEAR MANDATORY RULE: Some business executives are worried because Secretary of Commerce Charles Sawyer has not asked Congress to extend the voluntary allocations agreement authority beyond the expiration date, which is Sept. 30, 1949. They reason that if the voluntary provisions under Public Law 395 are permitted to lapse, then industry could be subjected to the mandatory priorities provided in the Selective Service Act of 1948.

Under the latter, the military establishment is empowered to place orders with industry having clear cut priority over the orders of any other customers. Failure to comply is punishable by imprisonment and fines and the President has authority to seize the plants of noncompliant companies.

In reality, the need for any type of allocation—voluntary or mandatory—has practically disappeared. However, the ease with which the present administration can cook up excuses for utilizing federal controls makes it desirable to have available a milder procedure than the mandatory one provided under the Selective Service Act. —p. 60

* * *

PRICE CHANGES AHEAD: Interest of steel consumers in prices of finished steel in the near future has been heightened by the statements made by a number of producers during recent weeks. While some spokesmen have hinted vaguely that lower prices may be expected at an indefinite time, the consensus of opinion is that base prices probably will hold, at least until the outcome of wage contract negotiations is known, and that some adjustments will be made in extras, possibly this week.

While anything can happen in a market such as that which exists today, it is more logical to expect that changes in extra cards will be made before base prices are altered. Extras now account for a larger percentage of the total price of steel than was the case before the war.

The appetite of customers for lower prices has been whetted by recent events and reductions in one form or another probably are not far away. —p. 59

* * *

FOR GREATER SECURITY: Reduced shipments of manganese from Russia to the United States have stimulated action to place American steel producers on a more secure basis as to manganese supply. The obvious alternatives are to find other sources, reduce the need for manganese and develop substitutes.

Efforts already are being made to help domestic producers to supply 20 per cent of the nation's manganese requirements at the present rate of consumption and to obtain more manganese from Brazil, India, Africa and elsewhere.

Also the Bureau of Mines, with the assistance of private industry, is working toward three objectives: 1. Reduction of sulphur in steel to reduce the need for manganese; 2. recovery of manganese from open-hearth slags; and 3. development of substitutes for manganese in steelmaking.

Each of these projects should contribute something to a more satisfactory situation in regard to this important mineral. —p. 60

E. L. Shaner

EDITOR-IN-CHIEF

News Summary

PRICING—Confusion surrounding industrial pricing policies deepened last week as the Supreme Court handed down a 4-to-4 decision in the rigid steel conduit case, thereby affirming the Federal Trade Commission's ban on basing point pricing (p.53). Because of the split decision, no opinion was issued to clarify the various issues involved. Industrialists turned toward Congress in hope of obtaining clarifying legislation. Although the decision appears to block widespread freight absorption by steel companies, Kaiser Co. Inc. (p. 54) is absorbing freight on shipments to seven western states. Many steel companies (p. 59) currently are revising extra cards.

CONFERENCE BOOTHS— Industrial supply and machinery manufacturers and distributors last week expressed satisfaction with their comparatively new convention plan. This provides that the manufacturers make available in convention hall booths their policy-making management officials for consultation with the distributors (p. 56) on problems of joint interest. Dominant problem at this year's Triple Mill Supply convention was how to sell in a buyer's market.

PENSIONS— Employers must bargain with employees on pensions, says the Supreme Court (p. 55). This ruling provides important ammunition for the large metalworking unions who are making pensions a primary demand in forthcoming negotiations. It complicates an already difficult problem. Setting up a pension program not only involves large, long-range costs, but also many technical problems. The headaches accompanying the job will be multiplied if companies are required to negotiate the provisions with union representatives, or in many cases, the representatives of several unions.

FIRST QUARTER EARNINGS—Net profits of leading steel producers in the first three months of this year dipped below the showing for the last quarter of 1948, although bettering the first quarter, 1948, showing (p. 58). The dip in earnings was in the face of alltime record steel production in the first quarter of this year.

"ULTRAMATIC DRIVE"— Packard's long-promised automatic transmission, called the "ultramatic drive," uses a torque converter for acceleration and positive mechanical drive for cruising (p. 67). This gives the driver complete control at all times, eliminates slipping once the torque converter is locked out through action of the mechanical clutch, and allows no sacrifice of economy at cruising speeds. The new drive will be standard equipment on custom models and later will become optional on the smaller eights.

EUROPE— A buyer's market is appearing in Europe, similar to that which is slowing down the domestic economy (p. 63). French manufacturers are asking for easier credit restrictions. Belgian scrap prices are falling. Machine tool builders are operating at only a fraction of capacity. British industrialists are looking toward their expositions to stimulate demand.

ALLOCATIONS— Although the need for the voluntary allocations program temporarily has about disappeared along with materials shortages, business men are concerned over the possibility that the program will be allowed to lapse (p. 60). They fear that materials shortages again may arise as result of increased military preparations, aid to western Europe, strikes or stockpiling and that industry then might be subject to the provisions of the Selective Service Act of 1948, which provides for mandatory priorities at the discretion of the military.

HERE AND THERE IN INDUSTRY—Clarence Randall has been elected president of Inland Steel Co. (p. 74) . . . Iron and steel exports continued to decline in January (p. 64) . . . General meeting of the American Iron & Steel Institute will be held May 25-26 (p. 65) . . . General Motors will lease the Struthers blast furnace for five years (p. 57) . . . Orders for busses dropped sharply in 1948 and outlook for the immediate months ahead is not cheerful (p. 70) . . . Atomic Energy Commission is stepping up uranium output (p. 70).

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Freight Absorption Stymied

Supreme Court ruling upholding basing point ban in rigid steel conduit case seen removing possibility of early return of uniform delivered steel prices on industry-wide basis

FREIGHT absorption in the sale of steel products received another legal haymaker last week when the U. S. Supreme Court, in a 4 to 4 decision, upheld a Federal Trade Commission ban on basing point pricing in the sale of rigid steel conduit.

Industrialists had been pinning their hopes on the rigid steel conduit decision for removal of the legal uncertainty that has enveloped pricing policies since the basing point decision in the cement case a year ago.

They were disappointed, however, since the Court rendered its ruling without comment or elaboration. In legal terminology the decision is known as a "per curiam" ruling, and it sheds no great amount of light on the question at issue. Consequently, the problem remains about where it was, being thrown completely back to Congress for definite solution.

Freight Absorption Out—In steel circles this latest decision of the Supreme Court is viewed as definitely writing off the possibility of any early resumption of freight absorption on an industry-wide basis. Steel men are extremely conscious of the fact in this decision the Court outlaws basing point pricing even when no charge of agreement among competing firms is involved.

As a result, it is believed the recently reported trend toward freight equalization in the industry by some interests will die aborning. There may be some exceptions, such as the Kaiser Co. which has begun to absorb freight on shipments to seven western states, and a number of smaller steelmakers who never abandoned the basing point system, but, generally speaking, the industry appears firmly committed to f.o.b. mill pricing until Congress acts.

Look To Congress—Steel men are unanimous in the view Congress will have to act if the pricing mess is to be cleaned up. Last week E. T. Weir, chairman, National Steel Corp., said the only remedy rests with Congress.

Frank Purnell, president, Youngstown Sheet & Tube Co., said the decision was a serious blow to the Youngstown and Pittsburgh districts.

Richard F. Sentner, assistant vice president of sales, United States Steel Corp. of Delaware, said industrial concerns were preponderantly in favor of freight absorption to meet in good faith delivered prices of competitors, and in the opinion of most, there is now only one legal price system, the f.o.b. method.

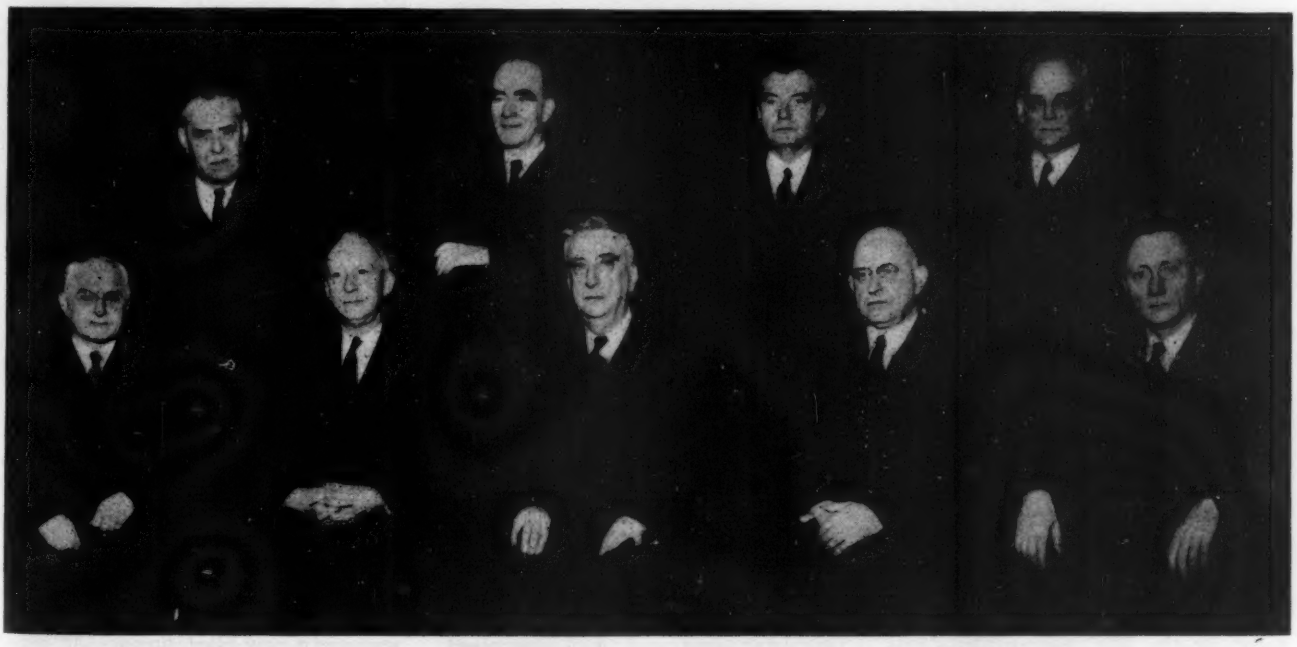
Failure of the Supreme Court to clarify the pricing problem in its steel conduit decision is thought likely to stimulate Congress to write clarifying legislation.

Revive Johnson Bill—The Johnson bill, S.236, which was placed on the shelf when the Supreme Court agreed to review the rigid steel conduit decision of the lower court, now will be dusted off for further study.

Last Monday the Senate Judiciary Committee reported favorably the Myers moratorium bill. Measure is aimed at protecting business against new FTC price orders during a period sufficiently long to permit action by Congress. The bill, as revised, sets a moratorium from the date of enactment to July 1, 1950.

Only Mill Pricing Seen Legal

ANALYZING the effects of the Supreme Court decision in the rigid



Supreme Court members, whose rigid steel conduit ruling may profoundly affect steel pricing practices, are shown here at the beginning of the session. Left to right, seated: Associate justices Felix Frankfurter, Hugo Black, Chief Justice Fred M. Vinson, associate justices Stanley F. Reed and William O. Douglas. Standing: Associate justices Wiley Rutledge, Frank Murphy, Robert H. Jackson and Harold H. Burton. NEA photo

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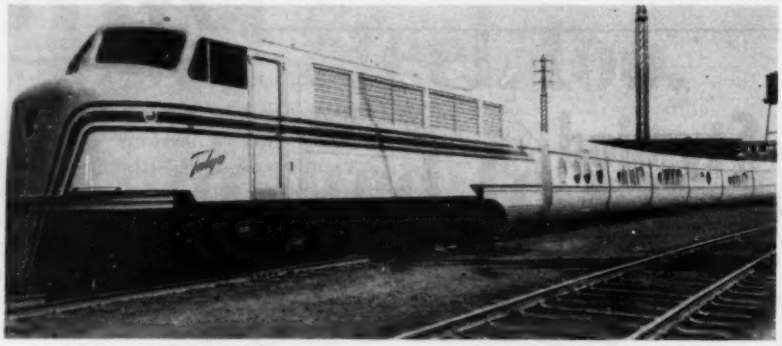

HUGGING THE RAIL: First train ever to be built in America based on the Spanish "Patentes Talgo" has been completed by American Car & Foundry Co. for testing and demonstration in America. Constructed at the Berwick, Pa., and Wilmington, Del., shops, this streamliner is the first of three such trains, the other two destined for service between Madrid and the French border. The "ACF-Talgo" unit, compared with standard streamline equipment on American railroads, has floors 2 ft 9 in. lower, a weight reduction of nearly 75 per cent due both to design and all-aluminum construction and an overall height lower by almost four ft. The name "Talgo" is derived from Tren (train) Articulado (jointed) Ligero (light) Goicoechea (the inventor) and Oriol (the man backing the train)

steel conduit case, legal experts of the steel companies generally agree it only confirms what they have been arguing all along, that is, that f.o.b. mill pricing is the only legal pricing method possible.

Virtually all recent court rulings, both by the Supreme Court and lower courts, have banned pricing methods which make for uniformity in prices. Among major decisions of the past year or two are the cement and rigid steel conduit cases, the Standard Oil case involving competitive pricing, and the Morton Salt case.

Good Faith Proviso—Steel lawyers contend the meeting of competition "in good faith" proviso of the Robinson-Patman Act has been rendered ineffective as a practical matter by the recent decision against the Standard Oil Co. by the U. S. Court of Appeals for the Seventh Circuit. In this case, the court ruled that where the Federal Trade Commission had shown injury to competition, it is no longer possible for the seller to justify a reduction in his price on the ground it was made in good faith to meet an equally low price of a competitor.

If the Seventh Circuit Court of Appeals decision against Standard Oil is sustained by the Supreme Court, the steel lawyers say it probably will produce a situation under which practically any price difference can be found by the FTC to constitute unlawful discrimination except where cost saving can be proved. This is held probable in light of the Morton Salt decision wherein the Supreme Court ruled the FTC has only to find a "reasonable possibility of injury to competition" to bring the case within statutory requirements.

FTC Position—The Federal Trade Commission has said there is nothing inherently or necessarily unlawful about delivered prices, zone prices, or freight absorption, but that there may be discrimination in any prices, and if these discriminations have monopolistic effects or result in injury to competition within the ruling of the Morton Salt case they are illegal. Also under the rigid steel conduit case, if such delivered prices are identical with those of a competitor they may be unlawful.

The commission also contends, it is pointed out, that both the cement and rigid steel conduit cases were basically conspiracy cases and the precedents established in decisions involving them are applicable only to conspiracy situations.

Steel lawyers point out that the FTC has indicated it regards as unfair method of competition, conduct where each of a group of sellers follows a particular practice with knowledge that the others are following the same practice, and, in fact, the practice thus used, resulting in suppression of price competition. Whether one chooses to call this a conspiracy or not, the commission has claimed that it contains all the elements of conspiracy under long-established and well-recognized interpretation of law. However, the rigid conduit decision is viewed as now refuting the commission's contention that the doctrine is applicable only to conspiracy situations.

Price Discrimination — Price differences which appear merely through a seller's action in meeting competition in good faith are not unlawful unless they injure competition. In the absence of such injury nothing in the Clayton Act prevents a seller from meeting competition as widely and as often as he chooses. If injury to competition appears as a result of the seller meeting an equally low price of a competitor in good faith, then illegal price discrimination occurs which will subject the seller to penalties. The question of whether or not price discriminations are properly attributable to meeting competition in good faith depends on whether injury to competition occurred, according to the ruling in the Standard Oil case.

This case has an important bearing on the delivered price question since the basis on which freight absorption was contended to be legal was that it constituted the meeting of competition under the "good faith" proviso of Section 2 (a) of the Clayton Act. This decision thus would outlaw absorption where the possibility of injury to competition can be shown.

Kaiser Absorbing Freight

West Coast steelmaker adopts practice in meeting competition in seven western states

DECISION of the Kaiser Co. to absorb freight on most of its products shipped from its Fontana, Calif., plant to seven western states, namely, California, Washington, Oregon, New Mexico, Arizona, Utah and Nevada, has meant the return of keener competition for business from western metalworking plants.

The decision simply means the company absorbs sufficient freight to meet the quotations of Bethlehem Pacific Coast Steel Corp., Columbia Steel Co. and the independents in the area outside southern California, where f.o.b. Fontana prices will continue to apply. The accompanying table shows base prices and the exact amount of freight absorption for five specific areas. No freight will be absorbed on plates and pipe.

Justifies Premiums — Premium prices quoted up to Mar. 22 are justified by Kaiser on the basis that the revenue was needed to expedite payment of the debt on the Fontana plant and for expansion. Now under way are a new blast furnace, 45 coke ovens, an 86-in. strip mill for producing sheets down to 14 gage and a Yoder mill for welded pipe output.

Kaiser will owe $80 to $85 mil-

FREIGHT ABSORBED BY KAISER CO. FROM FONTANA, CALIF.

(Cents per 100 lb)

To:	Freight Rate from Fontana, Calif.	Structural Shapes	H.R. Carbon Bars	H.R. Alloy Bars	H.R. Strip	H.R. Sheet	C.R. Strip
San Francisco ...	.3193	.2480	.1869	.2221	.2498	.2675	.2146
Sacramento	.4429	.3716	.2487	.3247	.3565	.3742	.3382
Seattle	.9534	.8071	.8284	.8980	.9268	.9445	.8487
Portland	.8784	.8071	.7534	.8230	.8520	.8695	.7737
Spokane	1.2692	*	.4784	.5488	*	.5953	*
Base price f.o.b. Fontana, Calif..		3.80c	4.00c	4.75c	4.65c	4.15c	5.55c

* No quotation.

lion when the expansion is completed but the plant will have a reproduction value of around $225 million. Production costs are reported to be exceedingly favorable and, in fact, a spokesman for Kaiser said that steel products can be delivered into the coastal market at costs lower than for any other company.

Kaiser is working on a 500,000 ton pipe order booked from the Transcontinental Gas Pipe Line Co. at $113 a ton. Shipments started four months ago and have averaged 15,000 tons a month.

Other Plants—Bethlehem Pacific and Columbia have strategically located plants for supplying a number of products, including bars, shapes, wire products, sheets, strip and tin plate. Columbia's costs on flat rolled products will be more favorable as soon as the link with the Geneva Steel Co. near Salt Lake City, Utah, is completed. Columbia's plant at Pittsburg, 50 miles outside San Francisco, now is getting 5500 tons of hot coils from Geneva weekly, plus 7500 tons a month from Tennessee Coal, Iron & Railroad Co. at Birmingham. Shipments of coils from Carnegie's plant at Gary, Ind., have been suspended. Eventually, Geneva is expected to supply the full requirements of both the Pittsburg mill and a new sheet mill at Torrance in the Los Angeles area. The latter will not be ready for two or three years.

Colorado Fuel & Iron Corp. is well under way with a new Morgan continuous rod mill which will tie-in with additional wire drawing capacity already installed. This company undoubtedly will go after a bigger chunk of the western market. It has, of course, a wire and wire products plant at Oakland, Calif., operated by the California Wire Cloth Co.

Situation Changed—Some Eastern steelmakers which withdrew from the western market again are interested in booking orders but the situation has changed vastly since prewar because of the construction of the many new and expanded facilities for production of carbon steel products. The higher alloys and specialties such as silicon sheets still must be supplied from the East.

Ford Seeking New Plant Site

FORD Motor Co., Dearborn, Mich., is reported considering the Cleveland and Pittsburgh districts as possible sites for blanking and stamping operations.

General Motors Corp. and Kelsey-Hayes Wheel Co., both of Detroit, have recently acquired plants in the Pittsburgh area.

Unions Ready Demands

STEELWORKERS will make a determined fight for comprehensive social insurance and pension programs this year, *Steel Labor*, official newspaper of the United Steelworkers of America-CIO, said last week on the eve of the union's wage policy committee meetings. The publication indicated the steel workers also will demand a wage increase.

The union paper said it believes the day when a corporation treats its machines better than its workers is just about over, indicating the pension demand will be based on an argument that industry should allow for worker depreciation just as it allows for equipment depreciation.

United Electrical Workers-CIO said that its demands against the large electrical equipment companies, including General Electric, Westinghouse, RCA, Sylvania and others, will amount to about $500 yearly and will include pension improvements, health programs, wage and salary adjustments and other economic benefits. Individual locals of the unions will determine how the $500 increase to be asked will be broken down, according to James J. Matles, national director of organization for the UE.

John L. Lewis' United Mine Workers met in Washington to formulate demands to be presented the mine operators in June. Although demands were not officially announced, they are understood to include an increase from 20 to 40 cents a ton in royalty payments to the miners welfare fund, shorter hours and work-spreading devices.

Bargaining on Pensions

Supreme Court holds employers must parley with unions on retirement income demands

EMPLOYERS must bargain with the unions on pensions. This confirmation to earlier rulings by the National Labor Relations Board and the lower courts was given by the Supreme Court last week when it refused to review a decision by the Circuit Court of Appeals at Chicago in the Inland Steel case.

The court decision is expected to be used as a weapon by the big metalworking unions in their quest for company-financed retirement programs during the coming wage negotiations.

It complicates an already difficult problem for companies considering the institution of pension programs or the amendment of plans already in effect.

Not Negotiable — Many pension specialists hold that retirement income programs are not negotiable (STEEL, Apr. 4, pp. 69-76). The subject is so technical that it is exceedingly difficult to obtain an accord among management, attorneys, the Internal Revenue Bureau and the bank or insurance company handling the program. Injection of union representatives into the picture, they contend, may make agreement almost impossible. And the complications multiply as the number of unions with which a company must bargain increases.

Relief from Congress?—Now that the high court has ruled on the matter, employers must look to Congress for relief. Appeals for changes in the law to exempt pensions as a bargaining matter will be made to the legislators. However, before any change can be made in the law, many companies will have to face the pension bargaining issue.

Attorneys and actuaries who have been studying the problem closely advise employers to prepare a sound factual basis for negotiation on the demands anticipated from the union, to prepare a well-trained bargaining team to meet with the union and then to proceed cautiously.

The obligation to bargain in good faith, they point out, does not include an obligation to accede to unsound union demands. Nor need companies attempt to match pension programs granted by competitors or by those companies which traditionally set wage patterns.

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Manufacturer Meets Distributor

Conference booth plan becomes entrenched at Triple Mill Supply convention. Selling hailed as foremost job in 1949 and sales force rebuilding held management's primary task

SELLING has replaced producing as the No. 1 job in 1949. During the remainder of this year and probably for several years to come, industry will be able to build just as much as its salesmen can sell.

This was the keynote of the Triple Mill Supply convention in Cleveland Apr. 25 to 27. How to revitalize sales forces grown soft and anemic during the sellers' market of the war and postwar years dominated convention addresses, conference booth and hotel room conversations.

Passing of the sellers' market was viewed realistically. Neither manufacturers nor distributors gave voice to dismay, but all were keenly interested in what steps were necessary to prepare for the return of competitive markets.

Big Job Ahead—James Y. Scott, president of the Van Norman Co., Springfield, Mass., and the Morse Twist Drill & Machine Co., New Bedford, Mass., pointed out that as a result of wartime expansion of plant, this country has a greater capacity to produce goods than the country can absorb. The big job ahead is to find a market for the output of this colossus and to sell that market.

"The challenge that is being placed before the American manufacturer and the mill distributor is to get sales, while at the same time reducing distribution costs through more effective selling."

Distributors Meet Manufacturers—Last week's convention was the second at which the three sponsoring groups, the American Supply Machinery Manufacturers' Association, the National Supply & Machinery Distributors' Association and the Southern Supply & Machinery Distributors' Association, experimented with the conference booth idea.

Under this plan, the manufacturers occupy booths in the exposition hall and have policy-making representatives available for consultation with the distributors.

Exhibits are banned. Booths are furnished practically identically. Attendance is limited strictly to members, to avoid confusion.

Hailed last year as a notable advance in industrial conventions, the conference booth plan became soundly entrenched at the Cleveland convention. About 275 booths were set up in Public Auditorium and both distributors and manufacturers welcomed the opportunity for conversations with each other.

JAMES Y. SCOTT

More than 2000 attended the convention.

Distributors Outline Problems — Both the conference booths and the more formal program gave distributors a chance to air their problems. Ray C. Neal, new president of the northern group of distributors, asked manufacturers to consider: 1. Better packaging and labeling of product; 2. restoration of 2 per cent cash discount; 3. prepayment of freight charges; 4. simplification of discount systems and quoting on a net price basis; 5. better selection and training of factory representatives; 6. closer attention to informing distributors of impending price changes; 7. restraint in appointment of distributors in a given area.

Manufacturers Elect Beardslee—K. R. Beardslee, vice president, Carboloy Co. Inc., Detroit, was elected president of the American Supply & Machinery Manufacturers' Association. F. T. Stone, Columbus McKinnon Chain Corp., Tonawanda, N. Y., was named first vice president, and Ralph M. Johnson, vice president, Norton Co., Worcester, Mass., was elected second vice president.

Ray C. Neal of the R. C. Neal Co., Buffalo, was elected president of the National Supply and Machinery Distributors' Association. George G. Weaks, president of the Weaks Supply Co. Ltd., Monroe, La., was named president of the Southern Supply & Machinery Distributors' Association.

Chart based on the new orders index of the American Supply & Machinery Manufacturers' Association anticipates business turns ahead of the Federal Reserve Board index. The industrial supply index is believed to be one of the most sensitive and accurate yet devised. At present, it is released only to members of the association who co-operate in its formulation. Examining the chart are, left to right: Chester Conner, manager, industrial sales, B. F. Goodrich Co., who sponsored the index; K. R. Beardslee, new president of the association; and J. G. Geddes, vice president, H. K. Porter Inc., and retiring president of the association

Heads Acetylene Group

Arthur J. Fausek named president of International Acetylene Association meeting

NEAR record attendance of about 500 steel, railroad and other industrial representatives as well as student engineers were present at the 49th annual conference of the International Acetylene Association in Pittsburgh, Apr. 25-26.

Arthur J. Fausek, president, Modern Engineering Co., St. Louis, was elected president of the association for the 1949-1950 term, succeeding J. J. Lincoln Jr., manager of railroad sales, Air Reduction Sales Co., New York, C. E. Monlux, vice president, Linde Air Products Co., New York, was elected vice president and E. V. David, assistant manager of Technical Sales Division, Air Reduction Sales Co. was reappointed treasurer. H. F. Reinhard was re-elected secretary.

Awarded Medal—The 1948 James Turner Morehead medal of the association was awarded to Herman Van Fleet of Air Reduction Co., New York, for his leadership and direction in the production of acetylene and oxygen.

Technical sessions of the convention included the following papers:

"Use of Oxygen-Acetylene for Scarfing in the Steel Mill"—by George Mersot, general foreman of billet conditioning, Indiana Harbor (Ind.) Works, Inland Steel Co.

"Flame Hardening"—John T. Howat, president, Pittsburgh Metal Processing Co., Pittsburgh.

"Applications of the Oxy-Acetylene Flame for Straightening, Forming and Cleaning Steel"—F. H. Dill, welding engineer, American Bridge Co., Ambridge, Pa.

"Background and Development of the Oxy - Acetylene Industry"—Alvah Small, vice chairman, Underwriters' Laboratories Inc., Chicago.

"Acetylene Chemical Industry in America"—C. J. Herrly, sales manager, Niacet Chemicals Division, United States Vanadium Corp., Niagara Falls, N. Y.

"Explosion Pressures in Industrial Piping System"—J. B. Smith, engineer, Factory Mutual Laboratories, Boston.

"Oxy-Acetylene Flame Shape-Cutting in Railroad Shops"—F. B. Rykoskey, supervisor of shops, Baltimore & Ohio Railroad, Baltimore.

"Heavy Cutting in the Steel Mill"—L. P. Elly, welding supervisor, Bethlehem Steel Co., Bethlehem, Pa.

"Steel Mill Cutting of Stainless Steels and Other Oxidation-Resistant Materials"—O. O. Nelson, general foreman, 160-inch mill, Homestead Works, Carnegie-Illinois Steel Corp., Munhall, Pa.

ARTHUR J. FAUSEK

The association has scheduled next year's convention at San Francisco, date to be announced later.

Steel Capacity Widely Dispersed

STEEL bar rolling capacity is more widely dispersed than that for any other finished steel product, being spread over 22 states, the American Iron & Steel Institute reports. In second place is plain wire, produced in 21 states.

Alabama has the third largest capacity for nails and staples, following Pennsylvania and Illinois. It also ranks fourth in plain wire and concrete reinforcing bars, fifth in wire rods, and is among the first ten states in bars, plates, hot-rolled sheets and strip, and heavy structural shapes.

California leads the nation in capacity for concrete reinforcing bars, is sixth in merchant bars, sixth in wire rods, seventh in hot-rolled strip, seventh in structural shapes, fourth in light structural shapes, and ninth in plates and nails and staples.

Illinois is first in plain wire and is second in heavy structurals, concrete bars, wire rods, nails and staples. In addition it is among the first ten states in bars, plates, hot-rolled sheet and strip, shapes and cold-finished bars.

Indiana holds second place in plates, hot-rolled sheets and light structurals, is third in merchant bars, cold-finished bars, and heavy structurals, and is among the top ten in plain wire, hot-rolled strip, reinforcing bars, wire rods, nails and staples.

Maryland is fourth largest in wire rods, fifth in plates, plain wire, nails and staples, and is in the top ten in capacity for hot-rolled sheets, reinforcing bars and cold bars.

Michigan ranks fourth in hot rolled sheet and strip, is eighth in merchant bars and sixth in cold-finished bars.

New York ranks fourth in heavy structurals, fifth in merchant bars, cold-finished bars, and concrete bars. It ranks among the top ten in hot-rolled sheet, light structural shapes, plain wire and wire rods.

Ohio has the largest capacity for both hot-rolled sheet and strip and the second largest capacity for cold-finished bars. It is third in light structural shapes, plain wire and wire rods.

Pennsylvania ranks first in merchant bars, plates, heavy and light structurals, cold-finished bars, wire rods, nails and staples. It is second in plain wire and hot-rolled strip and third in hot-rolled sheet and concrete bars.

GM Leasing Struthers Furnace

TEMPORARY injunction restraining Struthers Iron & Steel Co., Struthers, O., from leasing its blast furnace to General Motors Corp. was withdrawn last week by a minority stockholder. It is understood plans are now going ahead to conclude the lease on the basis of $200,000 rental per year. The lease will run for five years.

Struthers company is a subsidiary of Pittsburgh Coke & Chemical Co. Last month Pittsburgh Coke contracted to supply General Motors with substantial tonnages of pig iron, foundry coke and furnace coke for a period of five years, beginning Sept. 1. At the time the contract was announced it was said the agreement contemplated use of an outside blast furnace. Leasing of the Struthers stack is part of this arrangement.

The Struthers stack has been leased and operated by the Kaiser-Frazer Parts Corp. since the fall of 1946. While this lease doesn't expire until Aug. 31, the furnace was blown out on Apr. 6 and turned back to the Struthers company on Apr. 15.

The furnace, which has monthly capacity of about 14,000 tons of pig iron, will be operated by Pittsburgh Coke & Chemical for the Struthers company with P. B. Hanahan remaining as general manager. It is understood the furnace will resume production about July 1 with General Motors taking most of the output.

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Steel Earnings Slacken

Fourteen of 19 producers report first quarter net income under that of 1948's last quarter

RECORD production of steel in the first quarter of 1949 failed to give the steel industry as high earnings as might be expected. In fact, 14 of 19 ingot producers reported lower net earnings that period than in the final quarter of 1948.

Compared, however, with the first quarter of 1948, the initial quarter of 1949 was far superior earnings-wise, with the result that all except one of the 19 companies gained.

The accompanying tabulation by STEEL reveals 19 ingot producers representing approximately 86 per cent of the nation's ingot capacity had aggregate net earnings of $169,139,056 in the first quarter of 1949, compared with $178,033,637 in the fourth quarter in 1948.

Record Output—In the first quarter of 1949 the steel industry had whatever advantage might accrue from all-time production records, the ingot output averaging 101.5 per cent of capacity with a yield of 24,053,181 net tons of ingots. That this level may not be duplicated again soon is foreseen from slightly lower rate of ingot production thus far in the second quarter and from a lessened demand for steel.

Meanwhile, the industry's earnings possibilities may be adversely affected by lower prices and higher labor costs.

With overall production costs of steel still at a high level the break-even point likewise is high. Consequently, any severe reduction in operations would cause considerable concern among steel producers.

SHIPMENTS OF STEEL PRODUCTS BY MARKET CLASSIFICATIONS

Market Classifications	1948 Shipments (N.T.)	1948 Per cent of total	1947 Shipments (N.T.)	1947 Per cent of total	1946 Shipments (N.T.)	1946 Per cent of total
1. Steel for Converting & Processing	3,348,414	5.1	2,772,163	4.3	1,882,561	3.9
2. Forgings (Other than Automotive)	938,838	1.4	741,044	1.2	651,706	1.3
3. Bolts, Nuts, Rivets & Screws	1,284,653	1.9	1,293,027	2.1	1,054,717	2.2
4. Jobbers (Except Oil and Gas)	9,971,886	15.1	9,545,654	15.1	8,405,793	17.3
5. Construction & Maintenance (Except Oil and Gas)	5,115,195	7.8	5,337,065	8.4	4,153,041	8.5
6. Contractor's Products	2,507,977	3.8	2,243,399	3.6	1,598,739	3.3
7. Automotive (Incl. Automotive Forgings)	10,220,982	15.5	9,273,363	14.8	6,557,199	13.4
8. Rail Transportation	5,225,535	7.9	4,879,879	7.7	3,806,746	7.8
9. Shipbuilding & Marine Equipment	649,613	1.0	337,961	0.5	283,803	0.6
10. Aircraft	35,761	0.1	39,231	0.1	28,465	0.0
11. Oil & Gas Drilling (Incl. Jobbers & Constr.)	4,280,164	6.5	3,189,361	5.1	2,010,460	4.1
12. Mining, Quarrying & Lumbering	329,090	0.5	287,670	0.4	209,758	0.4
13. Agricultural	1,426,943	2.2	1,244,548	2.0	1,030,335	2.1
14. Machinery (Except Electrical)	3,188,718	4.8	3,031,719	4.8	2,415,517	5.0
15. Electrical Machinery & Equipment	1,594,700	2.4	1,595,520	2.5	1,154,506	2.4
16. Appliances, Utensils & Cutlery	1,959,878	3.0	1,564,722	2.5	1,227,154	2.5
17. Other Domestic & Commercial Equipment	1,713,806	2.6	1,680,259	2.7	1,398,055	2.9
18. Containers	5,302,373	8.0	5,076,170	8.0	4,255,287	8.7
19. Ordnance & other Military	56,029	0.1	56,908	0.1	30,458	0.0
20. Export	3,244,888	4.9	4,206,692	6.7	3,011,771	6.2
21. Shipments of Non-Reporting Companies	3,577,695	5.4	4,660,795	7.4	3,609,461	7.4
Total	65,973,138	100.0	63,057,150	100.0	48,775,532	100.0

Record Steel Shipments in 1948

STEEL shipment data for 1948 were released last week by the American Iron & Steel Institute showing that among major industries oil and gas obtained the greatest increase.

The institute's report showed the record distribution of 65,973,000 tons of finished steel during the year. This figure falls somewhat below that reported by STEEL (Apr. 4, 1949 issue) due to adjustment.

Steel Producers' Net Earnings—First Quarter, 1949

	Net Earnings 1st Qtr. 1949	Net Earnings 1st Qtr. 1948	Net Earnings 4th Qtr. 1948	Sales 1st Qtr. 1949	Sales 1st Qtr. 1948
United States Steel Corp.	$49,928,670	$27,857,341	$41,510,274	$664,892,529	$556,002,239
Bethlehem Steel Corp.	33,129,574	15,499,331	37,163,702	.....	.....
Republic Steel Corp.	15,298,628	9,132,980	16,625,594	215,514,697	182,324,128
Jones & Laughlin Steel Corp.	9,868,895	5,150,704	10,973,134	116,892,730	97,531,525
Youngstown Sheet & Tube Co.	10,022,660	6,423,566	12,372,402	106,574,356	88,033,031
National Steel Corp.	14,753,775	8,661,760	12,920,071	.....	97,536,141
Inland Steel Co.	9,254,230	8,458,544	13,787,373	101,684,486	90,739,868
Armco Steel Corp.	8,621,791	5,867,347	11,658,343	.....	84,051,619
Wheeling Steel Corp.	4,010,137	2,781,257	5,358,400	40,778,940	33,476,159
Colorado Fuel & Iron Corp.	2,518,797	1,632,631	3,270,597	.....	30,810,566
Sharon Steel Corp.	2,905,301	1,956,346	2,620,752	.....	26,351,250
Alan Wood Steel Co.	1,385,687	672,110	1,732,554	13,815,257	11,372,954
Continental Steel Corp.	203,086	213,417	597,641	7,343,860	7,170,087
Copperweld Steel Co.	1,090,637	717,697	1,957,635	.....	15,974,578
Portsmouth Steel Corp.	2,043,222	1,028,545	1,470,990	18,166,468	13,692,129
Barium Steel Corp.	1,031,388	676,062	1,095,622	13,921,000	12,137,000
Granite City Steel Co.	821,018	812,097	857,057	11,676,381	10,167,786
Carpenter Steel Co.	537,245	429,694	656,616	6,973,946	6,139,862
Crucible Steel Co. of America	1,714,315	567,786	1,404,880	.....	.....
Follansbee Steel Corp.	461,569	611,305	.....	.....	.....
Totals	$169,600,625	$99,150,520	$178,033,637	.....	.....
FINISHING CAPACITY ONLY					
Acme Steel Co.	$1,286,848	$1,964,468	$2,209,260	$14,572,476	$14,914,592
Superior Steel Corp.	104,645*	225,717	139,618	4,736,872	4,034,180
Thomas Steel Co.	468,642	411,606	443,654	3,121,505	2,751,869
PIG IRON CAPACITY ONLY					
Sloss-Sheffield Steel & Iron Co.	$875,340	$529,819	$880,540	.....	.....
Interlake Iron Corp.	1,757,193	1,146,506	2,295,764	.....	.....

*Net loss.

Changes in Extras Coming

Important revisions to be effected soon incorporating both increases and decreases

SOME important changes in steel prices are anticipated in event competition for business intensifies over coming months, but at the moment base price revisions do not appear in immediate prospect. Adjustments in extra cards, however, are in the making for early promulgation, possibly this week.

So far as can be learned revisions in extras and deductions will include increases and decreases. While steelmakers decline to state what products will be involved, it is believed certain the flat-rolled and bar cards will be among those revamped.

Await Developments — All producers have not stated their intention to adjust extras at this time, but most of them are waiting developments to determine policy. Benjamin F. Fairless, president, United States Steel Corp., a week ago announced his corporation would make some changes. Since then other companies have intimated they were interested. Granite City Steel Co. is understood to be planning a reduction in wide sheet extras and an increase in those on the narrow classification. A week ago Great Lakes Steel Corp. and Weirton Steel Co. reduced extras on hot-rolled sheets and strip to levels competitive with another leading producer.

In his announcement Mr. Fairless said the corporation's subsidiaries would make changes in extras and deductions "in the very near future" after careful study, and these revisions will result in higher charges for certain gages, widths, lengths and quantities, and in lower charges for others. The revisions, he said, will represent an effort to establish a more accurate pricing of extras in relation to the cost of performing the service covered by the extra or deduction.

Trade Perplexed—The steel consuming trade in general is somewhat perplexed as to just what to read into the plans for adjusting extras at this time. Some observers discount the suggestion the move is the first step toward placing the steel price structure on a lower level. Others, however, think otherwise, pointing out that the steel extra cards today exert a much more important role in actual steel costs than they did prewar. Consequently, it is reasoned revisions in published cards are more likely to be made than are changes in base quotations as producers adjust price schedules to meet new competitive market conditions.

Consensus of most steel men and consumers is that base prices will remain steady at least until union wage negotiations are concluded. A few, however, see the possibility of prices moving to lower ground immediately before the wage contract talks. This is pure speculation.

Last week E. T. Weir, chairman, National Steel Corp., said there was some prospect for lower steel prices and stabilization of present wage rates this year. However, he pointed out the prospect for lower prices should be tempered in light of higher operating costs resulting from an indicated decline in steel production, amounting to perhaps 25 per cent.

Sees No Early Change—Irving S. Olds, chairman, U. S. Steel, last week said he did not see any early important changes in the corporation's base prices. No changes are under contemplation at this time, he said, and if wages go up, he thought higher prices would be justified. Reduction in scrap prices to date have not had an important bearing on the corporation's steelmaking costs, he said, for the reason purchased scrap amounts to about 10 per cent of metallics used by the corporation, and a considerable portion of the scrap now being consumed is high-priced material.

Steel Expansion Provides Jobs

EXPENDITURE of more than half a billion dollars a year by iron and steel producers for new plants and equipment is one of the strong forces contributing to the record-breaking level of civilian employment in the postwar period, according to the American Iron & Steel Institute.

The $583 million spent by the industry last year was more than three times the annual 1935-39 average. After allowing for the increased cost of equipment, approximately double the prewar level, the physical volume of work was greater, requiring increased employment on plant construction and in equipment factories.

This year the planned expenditure of $627 million by the iron and steel companies for new plants and equipment will give a larger volume of purchasing power to workers and contractors than ever before. It is estimated that steel producers' improvement and expansion expenditures last year gave employment to nearly 50,000 persons in construction and in factories making equipment, or approximately the size of employment in the machine tool industry.

In addition to those employed directly on these projects, many others are in supporting industries.

Caps Industry Big Tin Plate User

DESPITE an average weight of but 0.109 ounce, production of beverage bottle caps required 163,058 tons of tin plate in 1948. American Iron & Steel Institute reports that 48.7 billion bottle caps were made in 21 plants in the United States last year. Industry consumption amounted to about 4 per cent of total tin plate shipped from steel mills in 1948.

SHAKEOUT: Massachusetts Institute of Technology gets the little brother of some of the world's largest foundry shakeouts for its foundry laboratory. Gift of Hewitt-Robins Inc., this Floatex shakeout was presented as part of the program initiated by Foundry Equipment Manufacturers Association to interest young men in foundry work

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Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Extension of voluntary allocations authority beyond Sept. 30 expiration date subject for consideration. Continuation for emergency use favored by some authorities

BUSINESS observers are concerned because Commerce Secretary Charles Sawyer has not yet decided to ask Congress to extend the voluntary allocations agreement authority beyond the Sept. 30 expiration date. They point out that if this authority is terminated industry could be subjected to harsh treatment under the mandatory priorities provisions of the Selective Service Act of 1948.

Under the utilization of industry section, the military are empowered to place orders with full priority over all other orders on producers' books. Penalties for noncompliance include imprisonment up to 3 years and fines up to $50,000—and the President may seize any noncomplying plants. A special paragraph gives the military the power to allocate steel for direct use, or for the use of contractors, and the same penalties are enforceable for noncompliance.

Allocations Need Over—Last year the President issued an order instructing the armed services and the Atomic Energy Commission to refrain from using these mandatory powers and, instead, to use the voluntary allocations procedure. But, say businessmen, this would be changed if Public Law 395, 80th Congress, were allowed to lapse, for the only allocations authority that then would be available would be the mandatory one in the Selective Servict Act.

Everybody agrees that the recent need for voluntary allocations agreements is about over, since shortages of materials rapidly are being relieved. But businessmen are afraid that this easier situation again might be tautened by any one of a number of possibilities. Expanded military rearmament, large military assistance to Europe, intensified stock piling, a coal strike—these are possible potentials for again bringing about an imbalance in steel supply and demand.

Favor Extension — Businessmen would like to see Public Law 395 kept on the books so that in the event of an emergency situation the interested industries could be called to Washington to enter into voluntary allocations agreements with full exemption under the antitrust laws. Under this law they have a chance to talk things over with the government and make recommendations; under the Selective Service Act the armed services could give them orders without any hearing.

The steel industry is not the only one affected; controlled distribution of many other materials might be required in an emergency. The voluntary allocations agreement procedure, it is recalled, was employed successfully in getting aluminum cable with steel core for the Rural Electrification Administration, and in getting copper, lead, zinc, cadmium, bismuth and asbestos for stockpiling.

Chances are considered good that if Commerce Department gets enough requests from industry it will go to Congress for continuation of Public Law 395. Secretary Sawyer is a strong believer in acting favorably on reasonable requests from industry.

Preparing To Quit—In the meantime, the Office of Industry Cooperation—Commerce's unit for administering the voluntary allocations agreement authority — is getting ready to go out of business Sept. 30. Dismissal notices, effective May 1 and June 1, already have been sent to many employees. This is because the work load is falling off so sharply due to lessened need for allocations. In the peak month, February, steel allocations came to 594,231 tons. In June they will total 442,415 tons and in July 272,244 tons. By September, according to Earl W. Clark, OIC director, the total will be very substantially smaller.

Manganese Conservation Pushed

WORK on its new manganese conservation program will be started by the Bureau of Mines early in May. Three targets have been set up: 1. Reduction of sulphur in steel to reduce the need for manganese; 2. recovery of manganese from open-hearth slags; and 3. development of substitutes for manganese in steelmaking.

Work will be done in the 3-ton open-hearth furnace which the bureau built at Raleigh, N. C., during the war but never used; this is now being re-erected at the bureau's Pittsburgh Experiment Station.

From steel producers, through the American Iron & Steel Institute, the bureau has received $50,000 toward financing the manganese conservation campaign. This amount being insufficient to carry out the full project, the breadth of the work will depend largely on appropriations the bureau gets from Congress. Opportunity for cutting manganese consumption is considered good; manganese consumption in 1948 averaged 13.8 pounds per ton of steel ingots compared with 11.2 pounds in 1940.

The bureau's program is but one phase of an overall manganese program being shaped up to meet the deficiency caused by reduced manganese shipments from Russia to the United States. Already launched are improvement projects which will enable domestic producers to supply roughly 20 per cent of manganese requirements at the present rate of consumption. Also under way are efforts to get more manganese from Brazil, India and Africa—notably from Brazil where the United States Steel Corp. is conducting negotiations looking toward opening up a large new deposit.

Reclamation Projects Approved

OF CURRENT new projects now before Congress on motion of the Bureau of Reclamation and the Army Engineers, eight were approved at the recent convention of the influential National Rivers & Harbors Congress as "sound in conception, needful, and sufficiently advanced in status to warrant endorsement." They involve an estimated cost of $665,704,100. They are as follows:

Tennessee - Tombigbee Inland Waterway in Mississippi; Green River Flood Control Project in Washington; Passaic Valley Flood Control Project in New Jersey; Okeechobee Waterway in Florida (from Stuart to Fort Myers); Intracoastal Waterway in Florida (from Miami to Key West); Central Valley Project in California; Ouachita River Project in Arkansas and Louisiana; Overton Lateral Red River Canal in Louisiana.

Renegotiation Regulations

PART 427 of Military Renegotiation Regulations, just made public by the National Military Establishment,

CINCINNATI FILMATIC Traveling Table Roll Grinders

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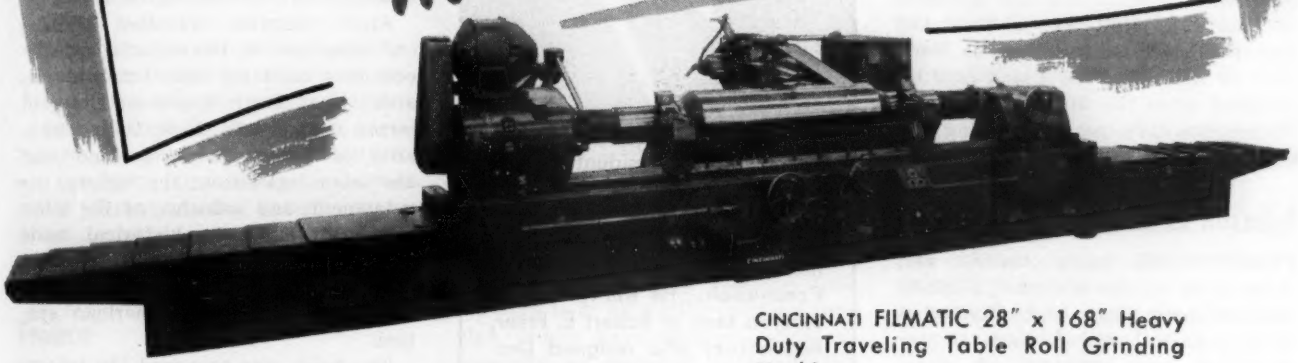

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contains the forms to be used in military renegotiation proceedings. The regulations require the Standard Form of Contractor's Report to be filed on or before the last day of the fifth month following the close of the contractor's fiscal year, but because the date already has been passed in some cases the Military Renegotiation Policy & Review Board has extended to July 31, 1949, the time for filing for contractors whose fiscal year ended between May 21, 1948, and Jan. 31, 1949.

All contractors having gross receipts of $100,000 or more from military business which is subject to renegotiation must fill in and file the form, after which a finding is made as to whether renegotiation proceedings are necessary. In addition to the standard form, additional reports required of contractors are specified in Part 427. Full text of Part 427 was published in the Federal Register of Apr. 19, 1949, which may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Johnson Eliminating Boards

TWENTY-ONE more boards and committees in the National Military Establishment have been eliminated by Secretary Louis Johnson as unnecessary and wasteful of time. Among them is the famous Joint Army-Navy Machine Tool Committee (JANMAT); on July 1 its policy functions will be transferred to the chairman of the Munitions Board and its operating functions to the Navy.

Another is the Joint Army-Navy Committee for Study of Palletization of Supplies. The latter committee has been inactive.

Another is the Joint Committee to Consider Common Utilization of Facilities & Functions which never was activated.

In addition, the charter of the Armed Services Contract Appeals Board has been ordered rewritten to tie the board more closely into the Munitions Board.

Tighten Up on Information

MILITARY contractors and subcontractors should inform themselves about the tightened curbs on release of information, in all publicized material including advertising copy, recently decided on by the National Military Establishment's new Security Review Branch.

Material concerning new equipment, equipment under development, etc., must pass a review before it can be released. The Security Review Branch calls for review not only for security but also for "policy and propriety."

FTC MEMBER: President Truman has nominated John Carson, a former newspaper man and political independent, to be a member of the Federal Trade Commission. He will fill the unexpired term of Robert E. Freer, Republican, who resigned Dec. 31. The term will run until September, 1952. Mr. Carson was formerly a city editor in Indianapolis and a Washington correspondent. From 1924 to 1936 he was secretary to the late Sen. James Couzens of Michigan. At present he is director of research and information of the Cooperative League of the U.S.A.

Airplane Power Plant Research

FUTURE airplane power plant research, according to an Air Force report to the Washington chapter, Institute of Aeronautical Sciences, must be directed toward increasing: (1) The compression ratios of gas turbine engines, (2) the cycle temperatures of gas turbine engines, (3) combustion efficiencies and intensities, and (4) the operating temperatures of heat resisting materials.

Stainless Steel Airplane

THE new X-2 supersonic airplane being built for the Air Force by Bell Aircraft Co., Buffalo, will employ stainless steel in body and swept-back wings instead of the conventional duralumin. Designed to travel much faster than the speed of sound —which is 760 miles an hour at sea level and 660 miles an hour at extreme altitudes—stainless steel retains its structural strength at the high temperatures developed in such fast flight.

Living Standards in America

OF WIDE interest to industry is a new Bureau of Labor Statistics book entitled "The Gift of Freedom." In 150 pages of illustrated text it describes the level of living of the American worker. Copies are available at 55 cents from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Eight chapters describe: Workers' employment characteristics; the economic basis for their living standards; what their wages will buy in terms of an hour's work; their standards of living; working conditions and labor legislation; the history, development, and influence of the labor movement; and the historical basis for personal and political freedom. The book also treats of "flaws" in the operation of the American system.

The book was prepared "to inform the worker in foreign countries how his American counterpart lives."

Larger Highway Program Urged

CAMPAIGN for doubling the size of the current highway program has been launched by the American Road Builders Association, Washington. Charles M. Upham, its engineer-director, quoting recent estimates of the Public Roads Administration that it will take $3 to $4 billion annually for 15 or 20 years to make our highways adequate for handling present and future demands, says that federal aid should be increased from $500 million to $1 billion a year. Even when matched by the states on a 50-50 basis, he says, the $2 billion thus realized would be minimum.

Disabling Work Injuries Off

DISABLING work injuries in 1948 fell below 2 million for the first time in eight years, according to Bureau of Labor Statistics. The improvement was registered in spite of greater employment in almost every industry group. The number of disabling work injuries was 1,960,000, almost 5 per cent under the 1947 total of 2,059,000.

Europe Sits Out Its Business Tremors

Economic shake-out similar to U. S. experience, as French firms urge easier credit, Belgian scrap prices sag and Britain looks for sales spur from its Industries Fair

ECONOMIC shakeout which is giving American industry the tremors has its counterpart in Europe. A buyers' market shows signs of gaining as steel and metalworking production mounts.

French manufacturers are urging easier credit restrictions to spur consumer buying. Farm purchasing is slow, and the public shows little interest in owning automobiles in spite of the fact that any French national with the money may now, for the first time in ten years, freely purchase a car.

Belgian scrap prices are slipping, and the nation's machine tool industry is operating at only a fraction of its capacity. In the United Kingdom, business men look hopefully to the British Industries Fair to revitalize a market already showing signs of weakness now that the steel subsidy diet has been withdrawn.

France

WITH food prices declining in France, the Gallic farmer is tightening his purse strings. One result of this has been widespread order cancellations with producers of agricultural equipment. Some implement firms are finding themselves in financial straits, and these companies are among the leaders in a fight to modify the government's tight credit restrictions.

Automobile companies are also pessimistic. Not only is purchaser credit a problem, but design as well. Many prospective buyers complain of the antiquated appearance of the models offered. Only two makes, the Renault and the Peugeot, are following American style trends.

March pig iron production was about 825,000 net tons, a postwar record. About 830,000 tons of ingots and castings were turned out during the month, another record, compared with 787,000 tons in February. Pig iron output was 88 per cent of the 1929 figure and 150 per cent of 1938. Ingot output about equaled the 1929 level and was 155 per cent of the 1938 figure. Rolled steel production in March, at 632,000 tons, was 105 per cent of 1929 and 165 per cent of 1938 levels.

Although the steel industry now has as much freedom from government controls as it has had in the past ten years, it still operates on a priority system under the triple control of the ministry of national economy, the Chambre Syndicale de la Siderurgie and the trade association to which the customer belongs. Export orders and government contracts get top priority. These controls may be eased before the year is out when additional finishing capacity comes in.

At Rehon and at Senelle new sheet mills are now being installed which may begin operations by the end of summer.

Belgium

WITH imports from Germany increasing, Belgian scrap prices have slipped. Steel rails, for example, are now quoted for all lengths at $36.36 per metric ton, compared with $38.63 two weeks ago and $45.45 in December, 1948. The machine tool industry is in difficulties because foreign orders have dropped. France, normally an excellent customer for Belgian tools, now has no orders pending.

Deliveries of steel and metalworking products to domestic users are now on a current or short-term basis. Industry is also wondering what the economic implications will be after the union with the Netherlands. Many manufacturers in Holland, not now competitive with Belgian counterparts, may become so after currencies of the two countries are equalized.

On the brighter side are negotiations pending for increased exports to Argentina. The most optimistic note, however, comes from Britain's rising steel export prices following withdrawal of subsidies. Both Belgium and Luxemburg are now in an improved competitive position.

Great Britain

BRITAIN, which looks to American purchasing power to take up some of the slack in its sagging industrial sales, welcomes more than 500 United States buyers, three times the prewar attendance, at the British Industries Fair opening today in London and Birmingham. The show will run until May 13.

More than 250 new inventions and processes will be displayed at the fair for the representatives of 103 countries and territories. Total area of exhibits has expanded to nearly 1 million sq ft. About 3200 manufacturers will display at Earls Court and Olympia in London and Castle Bromwich in Birmingham. Of these 3200, 1161 heavy goods makers will be in

GERMAN TRACTOR: Lanny Bulldog tractor manufactured in Mannheim, Germany, is shown at the Museum of Science and Industry, New York. Inspecting the tractor are, left to right: W. John Logan, director-general of the Joint Export-Import Agency for Western Germany, Dr. H. Karl Scharnagl, mayor of Munich, and George J. Santry, American Military Government official. NEA photo

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Birmingham, occupying 413,000 sq ft of stand space.

The number of exhibitors in the lighter industries in London are below the record of 1947 but 26 per cent above prewar fairs.

Steel Exports Decline

Shipments lower in a majority of classifications compared to year ago

TONNAGE of iron and steel products exported in January was slightly below the December total but about 80,000 tons below the corresponding month in 1948. January overseas shipments of semifinished and finished iron and steel products totaled 420,344 net tons, compared with 422,191 tons in December and 500,767 tons in January, 1948.

Compared with January of last year, decreases were effected in a majority of the categories included in the accompanying table compiled by the American Iron & Steel Institute from figures supplied by the Commerce Department. In the various pipe and tube classifications, however, shipments increased except for seamless boiler tubes which declined slightly from the total shipped in January, 1948.

Scrap exports in January totaled 17,543 tons; pig iron, 1063 tons; and ferroalloys, 4763 tons.

U.S. EXPORTS OF IRON AND STEEL—JANUARY

(Net Tons)

	January 1949	January 1948
Semifinished and Finished Products:		
Ingots, blooms, billets, slabs, sheet bars	17,363	41,590
Wire rods	2,562	4,834
Skelp	5,587	5,969
Iron bars	202	1,032
Concrete reinforcement bars	10,388	13,924
Steel bars, cold finished	32,974	6,899
Other steel bars (excluding alloy)	27,912	39,797
Alloy steel bars	2,085	14,270
Welding rods, electric	1,060	945
Plates including boiler, not fab	26,398	39,363
Plates, fab., punched or shaped	3,135	2,208
Iron sheets, black	1,910	1,828
Steel sheets, black	39,338	42,308
Galvanized sheets	5,908	4,396
Strip steel, cold rolled	5,871	6,587
Strip steel, hot rolled	8,308	7,346
Tin plate	53,083	55,168
Terne plate	1,199	646
Structural shapes, plain	27,194	29,813
Structural shapes, fab	18,187	17,347
Frames and sashes	175	176
Sheet piling	1,628	5,112
Rails, 60 lbs. per yard and over	17,466	42,445
Rails, less than 60 lbs. per yard	1,861	752
Rails, relaying	1,242	5,950
Splice bars and tie plates	1,134	13,085
Frogs and switches	437	1,220
Railroad spikes	265	1,163
Railroad bolts, nuts, and washers	163	787
Car and locomotive wheels, tires and axles	3,908	3,702
Seamless black pipe and tubes	2,948	1,419
Seamless casing and line pipe	30,426	14,307
Seamless boiler tubes	4,368	4,526
Welded black pipe	7,151	5,227
Welded galvanized pipe	7,713	3,821
Welded casing and line pipe	9,362	12,916
Welded boiler tubes	407	123
Other pipe and fittings	6,929	6,564
Plain wire	7,726	6,572
Galvanized wire	4,965	7,830
Barbed wire	4,216	7,251
Woven wire fencing	1,864	1,300
Woven wire screen cloth	600	477
Wire rope and strand	1,354	1,128
Wire nails	1,923	1,794
Other wire and manufactures	2,301	5,182
Tacks	271	347
Other nails, incl. staples and horseshoe nails	1,276	1,280
Bolts, nuts, rivets and washers, except railroad	3,139	5,489
Forgings	2,447	2,515
Horseshoes	15	37
TOTAL	420,344	500,767

Compiled by American Iron and Steel Institute from figures supplied by the Department of Commerce.

British steel foundrymen, after a tour including 22 casting plants to obtain American "know-how," attended a reception by Economic Cooperation Administration officials in Washington Apr. 21 prior to sailing for home on the Queen Elizabeth Apr. 28. Heading the group—at left with hands on back of chair—was F. A. Martin, president, British Steel Founders Association. Seated are ECA labor advisors, Clinton S. Golden (left) and Bert M. Jewell

British Foundrymen

Complete tour of American steel casting plants. Group impressed with practice here

WELL satisfied with what they learned during their stay, the group of 16 British steel foundrymen that has been touring the United States since Mar. 14, sailed home from New York Apr. 28. Aboard ship they will spend their time principally in digesting 22 reports of what they noticed at as many steel foundries. From these the group will prepare a comprehensive report which will be made available to management and labor in the 102 steel foundries of the United Kingdom.

The group, comprising representatives of management, technical experts and labor, was received Apr. 21 at Washington by officials of the Economic Cooperation Administration which sponsored the trip as an activity of the Anglo - American Productivity Council, the medium for promoting exchange of technical "know-how" between the two countries.

Acquired Information — Team leader F. A. Martin, managing director, Osborn Foundry & Engineering Co., Sheffield, and president, British Steel Founders Association, told a press conference in Washington that the group had garnered much information which it will be able to put to use when it gets back home.

The group was especially impressed with what the United States steel foundry industry does for its workers' welfare. It believed British industry is ahead of the United

States in smooth labor-management relations.

Pay Compliments—Some nice compliments were paid to American foundry machinery. W. Scott, a molder from Scotland, said: "In the United States you kill the machine, whereas in the U. K. we still kill the workers." Mr. Martin was impressed with the willingness of American foundrymen to take risks in trying out new things; many of the ideas work out successfully, he said, and thus the art of foundry practice is advanced.

But the group was not so sure whether it can gain much from American mass production methods as such. The overwhelming portion of U. S. markets, Mr. Martin pointed out, are at home, a condition that favors standardization of product, and thus encourages mass production. But at least half the products made by British industry, he said, are for export which means that other peoples' specifications have to be met.

The group was embarrassed in its tour by a story, in the anti-Marshall Plan *London Daily Mirror,* which reported that the mass production industry of Detroit was "a living hell in which the workmen never smile." Asked about this story at the Washington press conference, Mr. Martin admitted it may have correctly reflected feelings of a craftsman toward mass production which demands compactness of working area and restricts freedom of movement and mind of the worker, but added "We wish to be disassociated from the vaporings of a gentleman who had never before seen the work of a foundry."

During its tour, the British group visited steel foundries in northern New Jersey, in Milwaukee, Dearborn, Mich., Windsor, Ont., Detroit, Chicago, Columbus, O., Springfield, O., Eddystone, Philadelphia, Pa., Lebanon, Pa.

Warehousemen Meet May 23

AMERICAN Steel Warehouse Association will hold its 40th annual meeting May 23-24 at the Ritz-Carlton, Atlantic City, N. J.

Speakers at the convention include William Simon, former general counsel for Senate Trade Practices Committee, who will discuss "A Competitive Free Economy and the Federal Trade Commission"; Edwin B. George, economist with Dun & Bradstreet Inc., who will review the economic outlook; Leo Wolman, professor of economics at Columbia University, whose subject is "Labor Policy and Labor Law," and Edward L. Ryerson, chairman of Inland Steel Co.

Steel Institute Plans

For 57th general meeting about completed. Eleven papers scheduled at four technical sessions

PLANS have about been completed for the 57th general meeting of the American Iron & Steel Institute to be held at the Waldorf-Astoria Hotel, New York, May 25-26. Technical sessions will be held on May 25 and the general sessions and annual banquet the following day.

Opening the meeting May 25, Dr. Karl T. Compton, chairman, Research & Development Board, National Military Establishment, and chairman, Massachusetts Institute of Technology, will deliver the annual Charles M. Schwab Memorial lecture. Technical sessions in the afternoon will be devoted to four general subjects: 1. Increasing production in the open hearth; 2. control of sulphur in steelmaking; 3. research in steel melting; 4. general research.

Lead Technical Sessions—Chairmen of the technical sessions will be: H. W. Johnson, vice president, Inland Steel Co.; C. E. Davis, vice president, Alan Wood Steel Co.; R. S. Poister, vice president, Crucible Steel Co. of America; A. V. Wiebel, vice president, Tennessee Coal, Iron & Railroad Co.

Opening address at the general session will be by Walter S. Tower, president of the institute. This will be followed by addresses by Clarence B. Randall, president, Inland Steel Co. and Hugh Morrow, chairman, Sloss-Sheffield Steel & Iron Co.

An industrial relations session will be held in the afternoon with Sumner H. Slichter, Lamont University professor at Harvard University, speaking on "The Changing American Economy."

Preliminary list of papers to be delivered at the technical sessions follows:

"Increasing Open-hearth Production by Use of Oxygen, Better Refractories and Control of Slag," by Erle G. Hill, director of metallurgy and development, Wheeling Steel Corp.

"Material Handling and Transportation in Open-hearth Operations," by W. W. Bergmann, assistant superintendent, open-hearth department, Armco Steel Corp.

"Finished Steel Production; Possible Increase from Existing Equipment," by R. F. Passano, metallurgical engineer, Bethlehem Steel Co.

"Studies Relating to the Control of Sulphur in the Production of Pig Iron," by Truman H. Kennedy, general superintendent, and Arthur W. Thornton, division superintendent, blast furnaces, open hearth and bessemer and rolling mills, National Works, National Tube Co.

"Sulphur Control and Manganese Conservation in Open-hearth Furnaces," by D. E. Babcock, metallurgical engineer, Republic Steel Corp.

"Effect of Sulphur on Quality and End Uses of Steel Products," by M. Tenenbaum, research metallurgist, Inland Steel Co.

"The Chemistry of Metallurgical Slags," by N. J. Grant, associate professor of metallurgy, and John Chipman, professor of metallurgy, Massachusetts Institute of Technology.

"The Influence of Core Wire on the Characteristics of Low Carbon Steel Welding Electrodes," by C. B. Voldrich, D. C. Martin and P. J. Rieppel, Battelle Memorial Institute.

"The Distribution of Oxygen Between Molten Iron and Iron Oxide-Silica Slags," by Gerhard Derge, Carnegie Institute of Technology.

"Palm Oil Substitutes for Hot Dip Tinning," by W. R. Johnson, research metallurgist, L. C. Kinney, supervisor of chemical engineering, and John M. Parks, supervisor of nonferrous metallurgy, Armour Research Foundation.

"A Study of Paints for Enclosed Structural Members in Steel Housing Construction," by H. A. Pray, supervisor, and R. S. Peoples, assistant supervisor, Battelle Memorial Institute.

CALENDAR OF MEETINGS

May 2-3, Association of Iron & Steel Engineers: Annual spring conference sponsored by association's Rolling Mill Committee, Lord Baltimore Hotel, Baltimore. Group headquarters are at 1010 Empire Bldg., Pittsburgh.

May 2-4, American Society of Mechanical Engineers: Spring meeting, Mohican Hotel, New London, Conn.

May 2-5, American Foundrymen's Society: Foundry congress, St. Louis. Society headquarters are at 222 W. Adams St., Chicago.

May 2-5, Chamber of Commerce of the United States: 37th annual meeting, Washington.

May 4-7, Electrochemical Society: Spring meeting, Benjamin Franklin Hotel, Philadelphia. Society headquarters are at 235 W. 102nd St., New York.

May 5-6, American Society for Quality Control: Third annual convention, Copley Plaza Hotel, Boston. Society headquarters are at 4949 W. 65th St., Chicago.

May 9-10, National Association of Sheet Metal Distributors: Spring meeting, Deshler-Wallick Hotel, Columbus, O. Association headquarters are at 505 Arch St., Philadelphia.

May 9-11, Liquefied Petroleum Gas Association: Annual meeting, Palmer House, Chicago.

May 9-12, American Mining Congress: Coal convention and exposition, Public Auditorium, Cleveland.

May 10-13, American Management Association: National packaging exposition and conference on packaging, packing and shipping, Municipal Auditorium, Atlantic City, N. J. Association headquarters are at 330 W. 42nd St., New York.

May 11-13, National Welding Supply Association: Fifth annual convention, Hotel Gibson, Cincinnati. Association headquarquarters are at 505 Arch St., Philadelphia.

May 12-13, Instrument Society of America: Fourth annual spring meeting, Royal York Hotel, Toronto, Canada.

May 12-13, Rail Steel Bar Association: Annual meeting, Edgewater Beach Hotel, Chicago. Association headquarters are at 38 S. Dearborn St., Chicago.

May 13, American Institute of Electrical Engineers: Conference on electric equipment for materials handling bridges, Hotel Cleveland, Cleveland.

May 15-19, National Association of Credit Men: 53rd annual credit congress, Convention Hall, Atlantic City, N. J.

May 16-18, Industrial Furnace Manufacturers Association: Annual meeting, Hotel Cavalier, Virginia Beach, Va. Association headquarters are at 420 Lexington Ave., New York.

May 18, Bituminous Coal Research: Annual meeting, Columbus, O. Agency's head quarters are at 912 Oliver Bldg., Pittsburgh.

May 19-21, Society for Experimental Stress Analysis: Spring meeting, Hotel Statler, Detroit. Society address is Box 168, Central Square Station, Cambridge, Mass.

May 19-21, Automotive Engine Rebuilders Association: Annual convention, Baltimore. Association headquarters are at 415 N. Capital Ave., Indianapolis.

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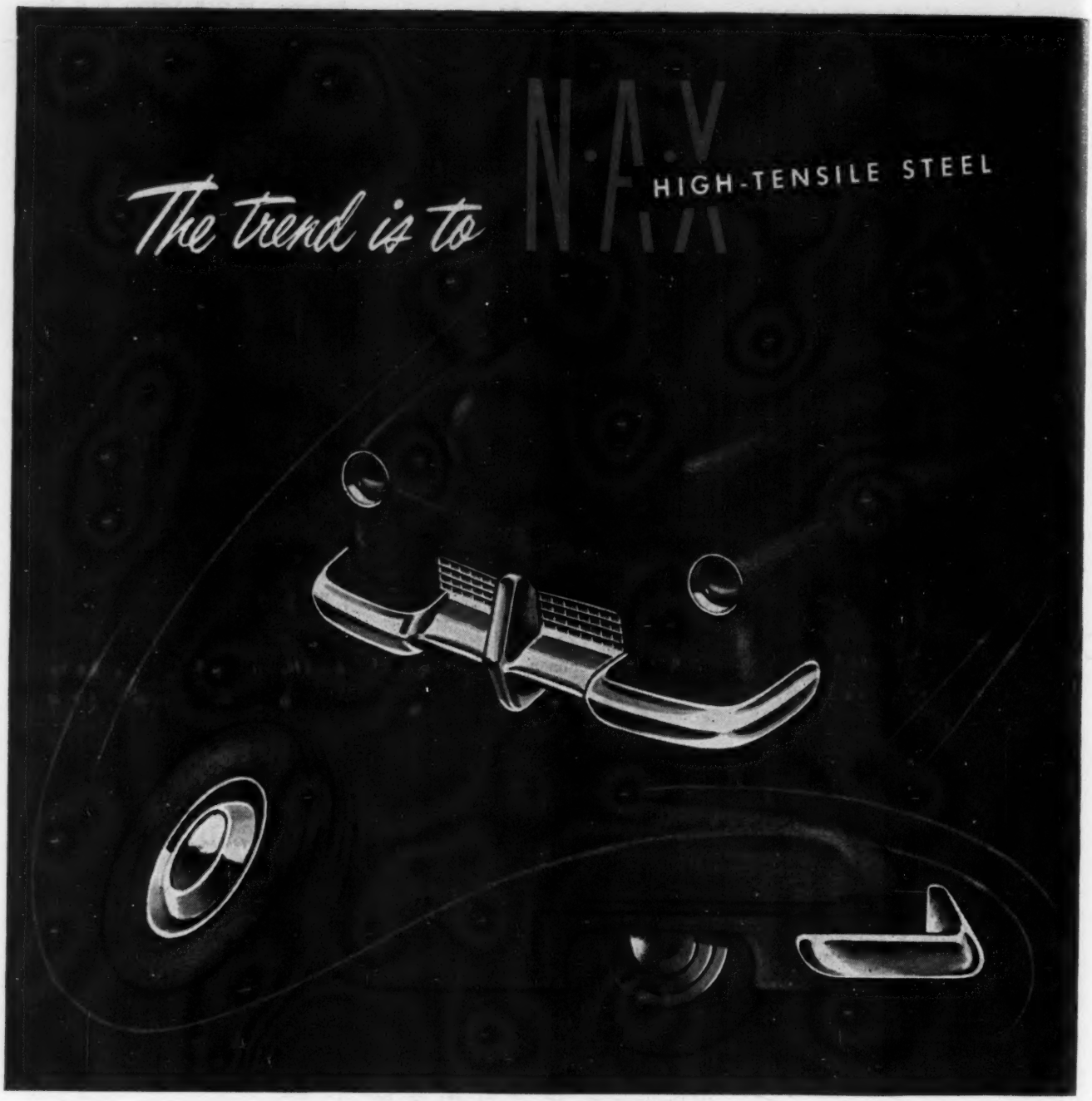

Since 1940, when Great Lakes Steel pioneered the application of high-tensile, low-alloy steel to cold-stamped automobile bumpers, there has been a growing trend to N-A-X HIGH-TENSILE steel in the automobile industry.

Today, every car manufacturer is using the inherent better properties of N-A-X HIGH-TENSILE steel for some part of his automobile.

Bumpers and grilles—hoods and fenders—body panels and deck lids—frames and bracings—wheels and hub caps represent a few of many applications of N-A-X HIGH-TENSILE steel to the modern car.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify—
N·A·X
HIGH-TENSILE STEEL

N-A-X HIGH-TENSILE MEETS ALL REQUIREMENTS OF S.A.E. 950

GREAT LAKES STEEL CORPORATION N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
Unit of National Steel Corporation

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Packard's automatic transmission called "ultramatic drive," impresses engineers. Torque converter used for acceleration, positive mechanical drive for cruising

DETROIT

AUTOMATIC transmission unveiled by Packard last week impressed many engineers as a design well ahead of anything of its type now available for passenger cars. Called an "ultramatic drive," it is unique in that a torque converter is used for acceleration and positive mechanical drive for cruising. Thus, if the driver presses hard on the accelerator, the unit does not shift automatically into positive drive until a speed of 55 mph is reached. If pressure is released at any point between 15 and 55 mph the unit shifts at once into direct drive.

The driver has complete control at all times, which is not the case with the step-type automatic transmission or with the plain torque converter design. Furthermore, there is no slippage once the torque converter is locked out through the action of a mechanical clutch which is in turn controlled by a governor, tied to engine speed and to car speed. Therefore, there is no sacrifice of economy at cruising speeds.

On Custom Models—At first the new Packard transmission will be furnished only on custom models and eventually it will be offered as optional equipment at additional cost on smaller eights. Production facilities are being geared to output of 40 transmissions per hour, and an investment of some $7 million has been made in elaborate automatic machining equipment. The new line of Golden Anniversary cars includes a 135-hp eight on 120-in. wheelbase, a 150-hp eight on 127-in. wheelbase and the 160 hp custom eight on 127-in. wheelbase. They are in 14 different body types, including a limousine, 7-passenger sedans, convertibles and station sedan. Changes in the two smaller eights have boosted the horsepower by five over preceding models. Body styling has been revised by changing the position of bright metal molding strips. Interiors have been redesigned. Rear windows are larger for improved visibility.

Some delays have been encountered in getting the new series into production, because of minor labor disturbances at Briggs plants where bodies are built, as well as on the final assembly line at Packard. A number of cars were being given a special gold finish and workmen complained of fumes, despite extra precautions taken to provide proper ventilation. On two occasions men walked out in protest.

Await New Willys Officers

FUTURE executive realignment at Willys-Overland, including the naming of a new president is expected shortly, following the resignation of James D. Mooney as president. He has been president and board chairman since he took over operation of the Toledo, O., company in 1946. After two years of booming sales, the jeep line of vehicles started to slip last December and frequent reports were heard of disagreement between Mooney and top level management. C. E. Sorenson, vice chairman of the board and large stockholder, who was brought into the company by Ward Canaday after conducting a brilliant career in charge of Ford production, took more or less a back seat when Mooney appeared on the scene. He is mentioned now as considering a return to more active participation in the business, possibly as president, a post he once held.

Mooney will continue as board chairman, according to the latest announcement, although there is considerable speculation over the status of many executives he brought into the managerial team during his tenure. There are literally scores of these so-called "Mooney men." Another possibility for president is Arthur J. Wieland, now executive vice president. At any rate, it looks like Canaday and Sorenson will be calling the signals from here on out.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

January	**445,092**	**422,236**
February	**443,734**	**399,471**
March	**543,927***	**519,154**
April		**462,323**
May		**359,996**
June		**454,401**
July		**489,736**
August		**478,186**
September		**437,181**
October		**516,814**
November		**495,488**
December		**514,337**
12 mos.		**5,549,323**

* Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
Apr. 9	**131,970**	**103,004**
Apr. 16	**131,821**	**104,761**
Apr. 13	**134,598**	**107,093**
Apr. 30	**130,000**	**102,967**

Estimated by Ward's Automotive Reports

Union Votes for Rouge Strike

AS WAS expected the union members at the Ford Rouge plant voted overwhelmingly to approve a strike. Before any action can be taken, however, it must be approved by the UAW International Board and this group likely will call for a detailed investigation and report before authorizing a walkout. The strike vote at the plant is considered to be more or less a routine matter, designed primarily to strengthen the union's hand in bargaining sessions which start in two weeks.

Bendix Strike Cuts Parts Supply

THE continuing strike of 7500 at the South Bend, Ind., plant of Bendix Aviation Corp., assumed serious proportions as supplies of brakes and brake parts dwindled for many car builders. The company furnishes these parts to all major car and truck producers except Chrysler and Studebaker. Nash already has been forced to close twice, and other interruptions are expected. An effort was made to ship out tools and dies from the strike-bound plant and set them up elsewhere. Massed union pickets at first tried to prevent movement of a train from the plant but later desisted.

Briggs To Require More Steel

APPROXIMATELY 445,000 tons of steel will be required this year by Briggs Mfg. Co. for production of automobile bodies and body parts, according to the present outlook. This

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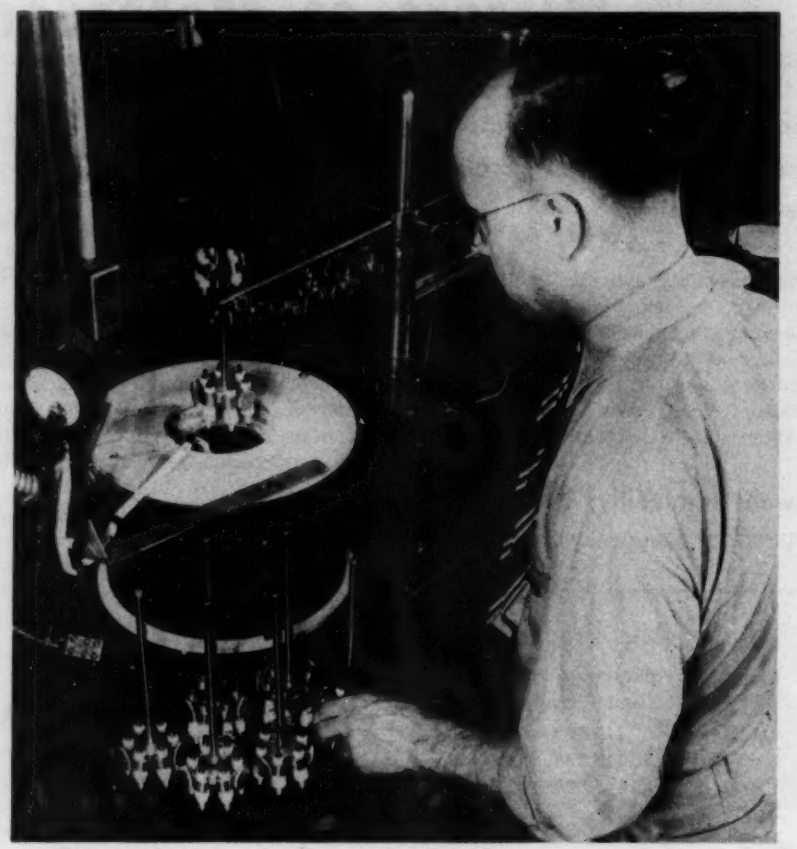


HEAT SHOCK TEST: At the AC Spark Plug Division of General Motors, Flint, Mich., a laboratory technician gives spark plug insulators the heat shock test to determine ability to withstand sudden and extreme temperature changes. Spot checks are made on insulators by dipping them in molten tin under controlled temperatures. Tin is used primarily because it won't oxidize on the surface. Many other inspections and tests are made

is an appreciable increase over the 351,135 tons used last year, itself a gain of 67,000 tons over that consumed in 1947. Ten years ago Briggs used only 168,000 tons of steel for bodies. Employment last year averaged 29,671, the highest in history except for the war years. Inroads of work stoppages and absenteeism on production were reflected in the loss of 11,094,254 man-hours during the 12-month period. This includes loss of output resulting from stoppages in suppliers' plants as well.

Develops Roller Chain Machine

A FULLY automatic single-unit assembly machine for production of roller chains has been developed by the H. D. Smith Mfg. Corp. here. A daily minimum of 3000 bicycle chains of 56-in. length now comes from the machine, and this is only 60 per cent of its capacity. In operation of the unit stocks of four different previously prepared parts are loaded into seven hoppers and are fed to a special carrier train. The machine literally "stitches" the chain together, and is supplemented by automatic inspection equipment which checks all the parts at a speed equal to that of the assembly unit. These inspection devices supplant about 50 people previously inspecting by hand.

Officials of the Smith company plan to develop an automatic packaging machine to handle and prepare the finished chains for shipment, and also look to adapting chain assembly machines to the production of industrial chains.

Hold Open House at Ford Plant

GENERAL Manufacturing Division of Ford held open house at its Mound Rd. plant last Friday. The plant, manufacturing rear axles, driveshafts, oil pans, flywheel housings, transmission shafts and front end linkage assemblies, was leased from the Navy Department in September, 1947, and includes 15 buildings scattered over a 140-acre site. Total average daily production of all parts is approximately 150,000. The operation is co-ordinated with the Canton, O., forging plant and the Highland Park plant in Detroit, as the General Manufacturing Division under supervision of John Dykstra.

The Mound Rd. unit has some of the most spectacular equipment and handling devices ever put together for processing rear axle housings, starting from lengths of tubing and then working to shape, both hot and cold, for half a housing. The formed pieces finally are welded together at the center to make the full housing. Scarcely a hand is placed on the pieces from start to finish. The company's "automation" department did a remarkable job in developing unusual mechanical means of moving the pieces through the various stages.

Tucker Plant Lacks Assembly Line

TRUSTEES of the Tucker Corp. in Chicago, making their first report to federal court, disclosed the plant lacked assembly lines and other facilities for automobile production, contrary to frequent statements by Preston T. Tucker, president. The trustees concluded that because of inadequate equipment and shortage of funds it would be impossible to manufacture cars at this time.

New Kaiser-Frazer Directors

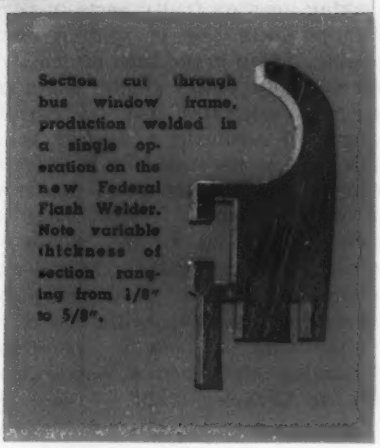
THEODORE V. Houser and J. F. Reis have been elected directors of Kaiser-Frazer. The former is vice president in charge of merchandising for Sears, Roebuck, and the latter has been vice president in charge of finance for K-F since June, 1946, and prior to that was long associated with Kaiser enterprises on the West Coast.

Last week Willow Run had to suspend operations because of the lack of sufficient quantity of brake parts furnished by Bendix.

Movie Increases Suggestions

SHOWING of a 35-mm sound-strip film on press shop methods, developed jointly by the Ford training department and supervisors in the company's pressed steel plant, resulted in more than doubling the number of improvement suggestions submitted by the plant's foremen. The films, using both cartoon sketches and actual photographs, review some of the improvements in manufacturing methods already installed and ask the viewers, "Can anything more be done to improve the operation?" In 90 days preceding the program's first presentation 55 suggestions for improvements were received; in the 90 days following these increased to 189.

New Federal Hydraulic Flash Welder Makes Difficult Aluminum Welds Easy



Section cut through bus window frame, production welded in a single operation on the new Federal Flash Welder. Note variable thickness of section ranging from 1/8" to 5/8".

OPERATION HERETOFORE CONSIDERED IMPRACTICAL NOW A PRODUCTION LINE REALITY

The Federal Machine & Welder Company developed for one of the nation's largest manufacturers of bus window and door frames, a hydraulically operated flash welder that would weld together sections of aluminum framing. The new welder turned a difficult and costly job into an inexpensive, high speed production operation.

This is another example of Federal welding "know-how" — another reason why Federal is first in resistance welding.

FEDERAL HYDRAULIC FLASH WELDER OFFERS THESE *Exclusive Features*

1. No tools required to set up or change the amount of upset, flash, final platen opening, pre-heat or position of current cutoff.
2. Change in final platen opening will not affect any other adjustment.
3. Change in position of current cutoff will not affect any other adjustment.
4. Change in adjustment to increase or decrease the amount of upset or flash will not change the relation of current cutoff to upset, finish, amount of pre-heat or final platen opening.
5. Complete control over upset speed.
6. Advantage of a two-speed upset for the welding of aluminum and other material requiring a rapid closure and slower forging action for best results. The speed of the forging action is adjustable.
7. It is not necessary to change flashing cams to weld steel, aluminum, copper, brass, or cast iron in any cross sectional area within the capacity of the machine.
8. Time necessary for a new setup when changing the machine from welding one material to another is a matter of minutes, where a die change is not required.
9. Retractable stroke for loading and unloading odd shaped pieces or parts loaded over locating pins. This feature is incorporated as part of the design and does not require any extra mechanism.
10. Platen may be slightly retracted in order to flash weld parts that must be loaded tight together. This feature, too, is a part of the design, requiring no extra mechanism.

Federal WELDERS®

RESISTANCE WELDERS FOR EVERY APPLICATION • FROM 50-TON OBI TO 2000-TON DOUBLE ACTION

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Busmen's Holiday

ACF-Brill, operating in the red, curtails bus output as cities retrench on purchases

ACF-BRILL Motors Co., Philadelphia, a subsidiary of Avco Mfg. Corp., indicates its 1948 operating losses result partly from city retrenchments on bus purchases.

Unfilled orders for busses on its books have fallen from about $22 million on Jan. 1 to $2 million as of Apr. 18. The immediate outlook is not cheerful, according to Irving B. Babcock, chairman, who does not look for any important resumption of demand by bus operators much before 1950. In keeping with lowered production schedules, the company has steadily reduced its personnel and estimates a saving in payrolls of nearly $900,000 on an annual basis.

Net Loss in 1948—The firm sustained a net loss of $3,327,568 in 1948. Nearly half of this represented non-recurring charges, principally in making good on faulty parts in postwar products and in writing down engine tooling in the light of demands for new type power plants. The management estimates that the current year will result in a loss of about $650,000 on the basis of foreseeable business, but hopes to be operating in the black on a current basis before the yearend. Of this year's estimated loss, about $343,000 will represent expenses in transferring bus operations from Nashville, Tenn., to Philadelphia and engine operations, Lycoming Motor, from Williamsport Pa., to Berkeley, Calif.

The company has three new models ready for market when demand returns. One is a deck-and-a-half observation coach being produced for Continental Bus System in Dallas. This seats 35 passengers on two levels and has a snack bar.

Pending a pick-up in business, ACF-Brill has been negotiating for the manufacture of other products.

BIG TURNOUT: Some 1500 General Electric stockholders from all parts of the country participated in the company's annual meeting, held in GE's new $30 million turbine manufacturing plant at Schenectady

Sun, Sohio To Build Oil Pipeline

SUN OIL Co. and Standard Oil Co. of Ohio have entered into a joint venture to build a new 1000-mile crude oil pipeline from Texas to Ohio at a cost of about $56 million.

The two companies have organized Mid-Valley Pipeline Co. to construct and operate the line which will originate near Longview, Tex., and will follow a northeasterly direction to Lima, O., passing near Cincinnati. Both oil companies operate refineries in Ohio which, by means of this pipeline, will have better access to crude production fields in Texas, Arkansas, Louisiana and Mississippi.

For most of the distance the line will be 22 in. in diameter. Its full capacity to Cincinnati will be about 150,000 barrels a day, with capacity of 140,000 barrels a day at the Lima terminus. The project includes construction of seven main pumping stations, two spur-line pumping stations and four oil terminals. Completion of the undertaking is scheduled for early 1951.

Pullman-Standard Output Up

MASS production techniques enabled Pullman-Standard Car Mfg. Co. to produce 30,255 freight cars, passenger cars and traction equipment units in 1948, compared with 23,939 in 1947 and 13,677 in 1946. Production in 1948 included 29,280 freight cars, 457 railway passenger cars and 518 traction equipment units.

An important factor in the year's results was the standardized PS-1 box car, designed to achieve mass production speed and economy. From the time of the first deliveries in June, 1947, to the close of 1948, 17,093 of these cars rolled off the assembly lines. Over a period of several months these cars were being completed at the rate of one every 20 minutes on each of three assembly lines.

AEC Expands Uranium Output

ATOMIC Energy Commission has contracted with U. S. Vanadium Corp. for the rehabilitation and operation of the corporation's uranium-vanadium processing plant at Uravan, Colo.

U. S. Vanadium agrees to rehabilitate the plant and the company-owned townsite and install new equipment and facilities for the recovery of uranium. The commission agrees to purchase the mineral production of the plant at a guaranteed unit price until June 30, 1954. The Uravan plant will be ready for operation about the end of this year. In the meantime, U. S. Vanadium will secure ore through production from its own mines and through purchases from other producers. Part of the ore supply for Uravan will also come from mining properties in the Calamity, Colo., area which was acquired by the government during the war. The lease of these claims to U. S. Vanadium on a royalty contract is also provided for in the contract.

This new contract completes arrangements for operation of all five of the existing uranium-vanadium ore-processing plants in the Colorado plateau region. A year ago only two were in operation—one at Naturita, Colo., owned by Vanadium Corp. of America, and one at Rifle, Colo., owned by U. S. Vanadium. In the past 12 months a plant at Durango, Colo., has begun operations under commission ownership, and the plant at Rifle has expanded production and begun ore purchases from independent miners. A plant at Monticello, Utah, has been purchased by the commission and is now being redesigned and improved, with operation scheduled by July.

Briefs . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

National Tank Co., Tulsa, Okla., producer of oil field equipment, held an open house Apr. 30 and May 1. The company is completing a plant expansion program.

—o—

Leslie Co., Lyndhurst, N. J., maker of valves, control devices, air horns and steam whistles, reports that each of its employees has received payments ranging from $20 to $300 as his share in 1948 earnings under a profit-sharing plan adopted last November.

—o—

Borg-Warner Corp., Chicago, is suspending operations of its Ingersoll Utility Unit Division, maker of packaged units consisting of furnace, water heater, bath and kitchen, together with plumbing waste and vent systems, for small houses. Housing uncertainties necessitated the action. Operations at the division's Evansville, Ind., plant will be continued until existing backlogs are worked off by early June.

—o—

Westinghouse Electric Corp. has shipped an electric transformer rated at 145,000 kilovolt-amperes and capable of handling 195,000 hp from its Sharon, Pa., plant to Detroit Edison Co. which will install the 121-ton unit in its Trenton Channel Station to supply the Detroit area.

—o—

Rich Steel Co., warehousing firm, has moved to a new and larger plant and warehouse at 2435 E. 37th St., Vernon, Calif.

—o—

Aluminum Research Institute has moved to suite 1923, 20 N. Wacker Dr., Chicago.

—o—

Aro Equipment Corp., Bryan, O., maker of lubricating equipment, pneumatic tools and other products has appointed Aro Sales & Service Inc., newly formed, as its West Coast distributor. Aro Sales' headquarters are at 2023 S. Grand Ave., Los Angeles, and another office is at 766 Brannan St., San Francisco. Sales for the Northwest will be handled by Pratto Sales Co., Seattle.

—o—

Lennox Furnace Co., Columbus, O., manufacturer of air conditioners and furnaces, is offering for sale the land and buildings at Ironton, O., of one of its affiliated companies. Operated as a foundry during the past five years, this property was formerly owned by Foster Stove Co. and Continental Stove Co. Facility contains 140,000 sq ft of floor area.

—o—

Great Lakes Steel Corp. has awarded a contract to Wilputte Coke Oven Division of Allied Chemical & Dye Corp., New York, for construction of 16 ovens at Ecorse, Mich.

—o—

S. J. Stewart Electric, New Orleans, engaged in motor repair work, is celebrating its 50th anniversary. Mr. Stewart has been sole proprietor of the firm since its formation in 1899.

—o—

Reynolds Metals Co., Richmond, Va., has begun production of aluminum at a newly opened pot line in Jones Mills, Ark. Aluminum produced at Jones Mills will go into production of cable.

ORE UNLOADERS

WHEELING & Lake Erie Railway has awarded a contract to Wellman Engineering Co., Cleveland, to construct and install two 17-gross ton, electrically-operated, Hulett-type ore unloaders at the Huron, O., dock.

Installation is expected to be completed and operations begun by the middle of the 1950 Great Lakes shipping season. Cost is estimated at $2 million, including more than $1.6 million for the unloaders. A power substation and power feeders to supply current are included in the project.

Adalet Mfg. Co., Cleveland, maker of bushings, fittings and related products, has appointed Vincent J. Brown Co., Buffalo, as a factory representative.

—o—

American Steel & Wire Co., a U. S. Steel Corp. subsidiary, will formally open its new stainless steel wire mill at Waukegan, Ill., June 23. The unit will have a capacity of 500 tons a month.

—o—

General Electric Co., Schenectady N. Y., has sold two porcelain enameling furnaces to Kaiser Engineers Inc., Oakland, Calif., for installation this summer in the Kaiser Fleetwing plant in Bristol, Pa. These furnaces will be used to porcelain enamel bathtubs and kitchen sinks. One furnace, rated 1855 kw, is 120 ft by 15 ft. The other, rated 1200 kw, is 85 by 15.

—o—

Syncro Machine Co., Perth Amboy, N. J., maker of machinery for the wire industry, has acquired sales and manufacturing rights to a continuous electric strand annealer developed by Cook Engineering Co., Paterson, N. J.

—o—

Baker Industrial Truck Division, Baker-Raulang Co., has moved its general offices to 1250 W. 80th St. Cleveland. The division's manufacturing operations, presently located at the W. 25th St. plant, will soon be moved to the 80th St. location.

—o—

Fred J. Reynolds, Davenport, Iowa, is manufacturers' representative in western Illinois and Iowa for Corey Steel Co. and International Spring Co., both of Chicago.

—o—

American Drill Bushing Co., maker of drill jig bushings, has opened a new office and plant at 1608 Essex St., Los Angeles.

—o—

Institute of Scrap Iron & Steel Inc., Washington, is planning a one-week training course in the fundamentals of the iron and steel scrap industry in conjunction with Northwestern University, which will probably be held in August.

—o—

Oakite Products Inc., New York, specializing in cleaning materials and methods, is observing its 40th anniversary.

—o—

Lovejoy Tool Co. Inc., Springfield, Vt., producer of milling cutters and related products, has appointed A. J. Rod Co., Houston, as representative in southern Texas.

—o—

Samuel & Hirschberg, Hackettstown, N. J., has acquired manufacturing rights for a line of paint line-striping machines for industrial plants and highway use, formerly made by Industrial Tools & Products Corp., Rochester, N. Y.

—o—

D. J. Murray Mfg. Co., Wausau, Wis., has appointed the following manufacturers' agents as distributors of its Grid unit heaters and allied products in their respective areas: I. Ernest Shaer, Boston; G. T. Pottinger & Co., Atlanta; Jordan Engineering Co., Cincinnati; Lefler Wyomont Supply Co., Casper, Wyo.

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The Business Trend

INDUSTRIAL activity as reflected by STEEL's industrial production index was at 175 per cent (preliminary) of the 1936-1939 average in the week ended Apr. 23, up 1 point from the preceding week. The current level of operations is the best for the year to date and is due largely to peak operations in the automotive industry.

AUTOMOBILES—Assemblies during the week ended Apr. 23 totaled 134,598 passenger cars and trucks as the industry seemingly returned to the normal pattern of booming sales during the spring months. Outturn during the latest week was the best since 1937 and represented a gain of almost 2800 units from the revised total of 131,821 for the preceding week. Clouding the picture, however, is growing labor resentment against industry pressure to boost worker productivity as the builders make ready for a return to prewar competitive selling.

STEEL—Production of steel for ingots and castings was at 99 per cent of capacity in the week ended Apr. 23, unchanged from the preceding week but 2 points below a month ago. Although a number of steel mill products are still tight, consumer pressure has eased noticeably since the first of the year because of lessened demand for many items.

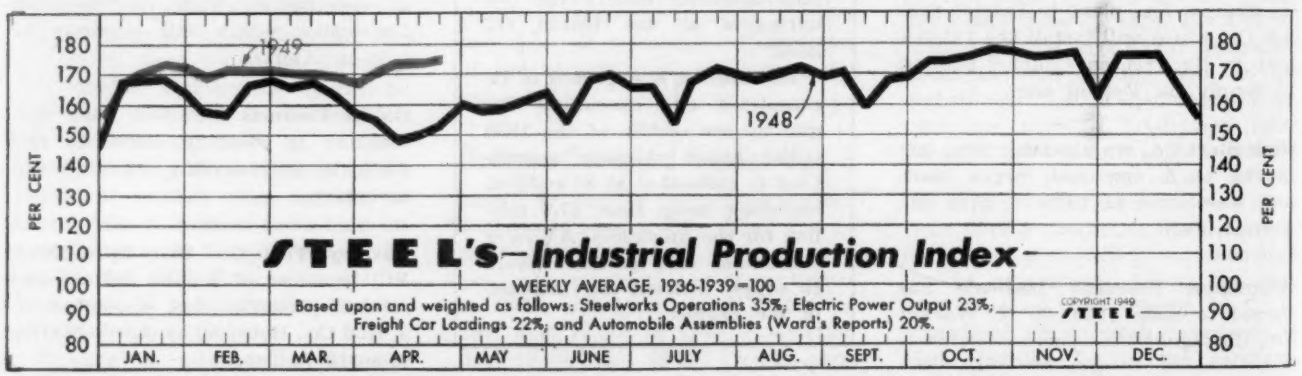
COAL—Bituminous coal ouput in the week ended Apr. 16 was 11,450,000 net tons, compared with 7,836,000 tons in the like week a year ago. Aggregate production for 1949 is 148.9 million tons as against 152.7 million tons for the corresponding period last year. The gap between production for similar periods in the two years has been narrowed in recent weeks because of a month-long strike resulting from the welfare fund dispute during 1948.

BUSINESS—A rise of 24 per cent in business failures brought the March total to 849, a postwar high, according to Dun & Bradstreet Inc. Casualties were almost 80 per cent larger than in the comparable month of 1948; moreover, they exceeded any March since 1942. Total current liabilities of $97.4 million were involved in March failures, a volume exceeded only twice on record.

RAILROADS—Association of American Railroads estimates that railroad operating incomes in March decreased 6.4 per cent as compared with the same month in 1948. The association estimate covers operating revenues and does not take into account increases in operating expenses that have taken place since March, 1948. Freight revenues declined 5.6 per cent and passenger revenues 10.8 per cent.

CONSTRUCTION—Civil engineering construction volume totaled $107.3 million in the week ended Apr. 21, compared with $136.7 million in the corresponding week last year. The cumulative total of about $2.3 billion for the first 16 weeks of 1949, however, is 22 per cent above the total a year ago.

PRICES—Bureau of Labor Statistics wholesale price index continued its decline to 156.9 per cent of the 1926 average in the week ended Apr. 19 from 157.6 the preceding week.



Index (chart above): Week ended Apr. 23 (preliminary) 175 Previous Week 174 Month Ago 167 Year Ago 153

BAROMETERS of BUSINESS

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	99.0	99.0	101.0	75.5
Electric Power Distributed (million kilowatt hours)	5,326	5,343	5,404	5,027
Bituminous Coal Production (daily av.—1000 tons)	1,908	1,877	478	1,306
Petroleum Production (daily av.—1000 bbl)	4,916	4,912	5,130	5,415
Construction Volume (ENR—Unit $1,000,000)	$107.3	$158.2	$180.9	$136.7
Automobile and Truck Output (Ward's—number units)	134,598	131,821	121,341	107,093

* Dates on request. † 1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.

TRADE				
Freight Carloadings (unit—1000 cars)	760†	766	596	852
Business Failures (Dun & Bradstreet, number)	198	184	166	100
Money in Circulation (in millions of dollars)‡	$27,408	$27,507	$27,423	$27,718
Department Store Sales (changes from like wk. a yr. ago)‡	+7%	+7%	−16%	+8%

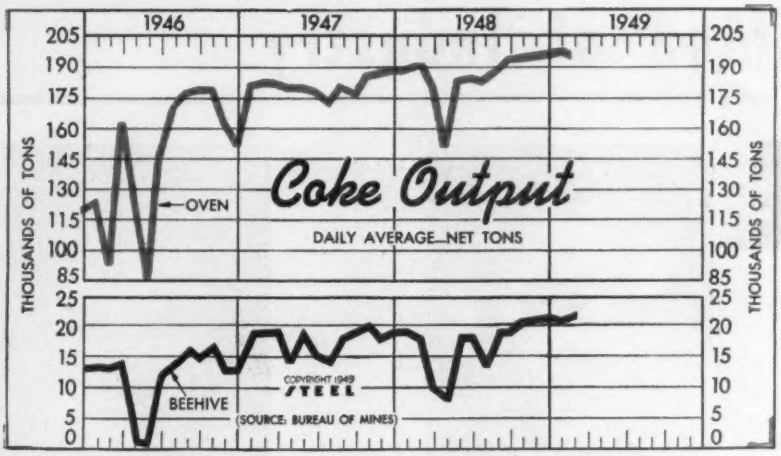
† Preliminary. ‡ Federal Reserve Board.

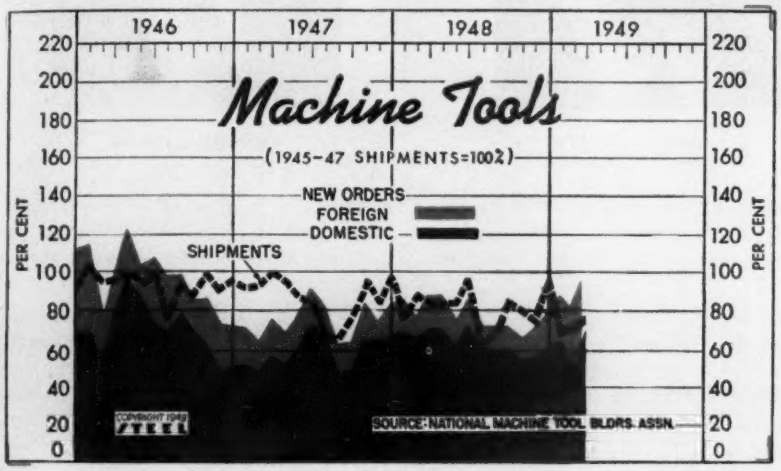
Coke Output

Bureau of Mines

(Daily Average Net Tons)

	Oven		Beehive	
	1949	1948	1949	1948
Jan.	196,000	189,191	20,121	19,588
Feb.	195,551	190,098	21,689	18,625
Mar.	.....	182,340	.....	10,485
Apr.	.....	149,692	.....	8,235
May	.....	184,568	.....	18,651
June	.....	186,425	.....	18,045
July	.....	184,286	.....	14,032
Aug.	.....	188,468	.....	19,751
Sept.	.....	192,090	.....	19,616
Oct.	.....	192,440	.....	20,083
Nov.	.....	193,565	.....	20,341
Dec.	.....	195,670	.....	20,588
Ave.	.....	185,770	.....	17,338





Machine Tools

(1945-1947 Shipments = 100)

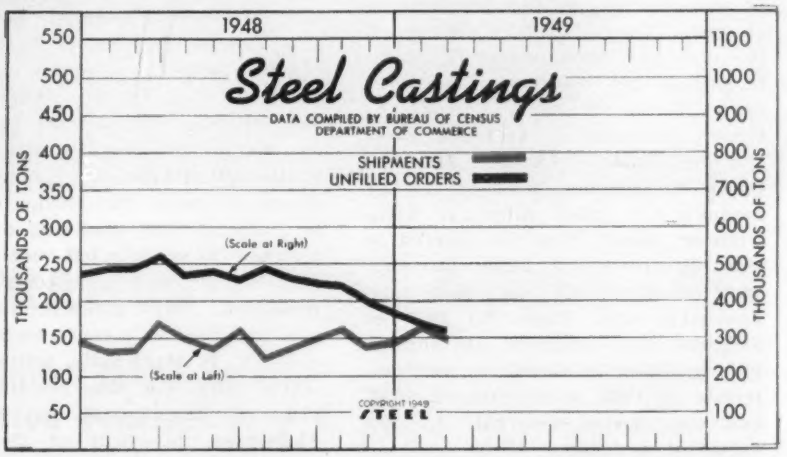
	Orders				Shipments	
	Total		Domestic			
	1949	1948	1949	1948	1949	1948
Jan.	87.0	83.1	65.1	69.1	68.8	75.3
Feb.	80.9	77.3	54.4	64.6	70.3	87.1
Mar.	93.1	86.3	70.8	70.2	75.3	83.6
Apr.	...	86.3	...	72.2	...	82.0
May	...	73.5	...	62.1	...	82.6
June	...	83.4	...	71.5	...	94.4
July	...	74.0	...	61.1	...	62.4
Aug.	...	73.7	...	60.9	...	69.8
Sept.	...	73.1	...	61.5	...	84.7
Oct.	...	67.4	...	53.4	...	80.4
Nov.	...	72.2	...	54.1	...	76.2
Dec.	...	76.7	...	60.5	...	96.9

Steel Castings

(Net tons in thousands)

	Shipments			Unfilled Orders*		
	1949	1948	1947	1949	1948	1947
Jan.	140.6	141.1	139.0	338.9	491.7	365.5
Feb.	135.0	142.4	125.6	320.2	497.1	421.4
Mar.	....	162.9	134.9	....	508.8	434.9
Apr.	....	150.3	144.2	....	472.4	427.6
May	....	143.3	140.9	....	482.5	443.2
June	....	152.9	139.0	....	470.0	445.5
July	....	120.4	117.0	....	497.4	473.9
Aug.	....	140.2	120.4	....	472.5	478.6
Sept.	....	149.2	137.4	....	448.0	526.2
Oct.	....	153.0	148.4	....	424.5	497.3
Nov.	....	146.8	130.1	....	395.0	493.3
Dec.	....	157.4	148.1	....	354.5	489.4

* Castings for sale.



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,129	$12,004	$14,088	$14,226
Federal Gross Debt (billions)	$251.4	$251.5	$251.8	$252.3
Bond Volume, NYSE (millions)	$18.8	$12.3	$14.4	$33.8
Stocks Sales, NYSE (thousands)	5,228	3,712	4,204	10,545
Loans and Investments (billions)†	$61.1	$61.0	$62.4	$62.9
United States Gov't. Obligations Held (millions)†	$32,767	$32,397	$33,112	$35,260

† Member banks, Federal Reserve System.

PRICES

STEEL's Composite Finished Steel Price Average	$94.45	$94.91	$97.23	$81.14
STEEL's Nonferrous Metal Composite‡	194.4	202.3	220.4	196.6
All Commodities†	156.9	157.6	158.2	164.8
Metals and Metal Products†	171.5	173.5	175.1	157.4

† Bureau of Labor Statistics Index, 1926=100. ‡ 1936-1939=100.

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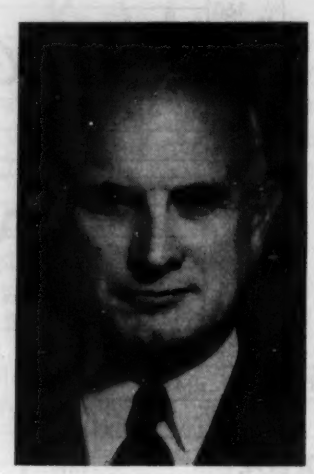
Men of Industry

CLARENCE B. RANDALL



GEORGE B. BEITZEL

WENDELL GARMAN

Edward L. Ryerson has been re-elected chairman of the board and chief executive officer of Inland Steel Co., Chicago. **Clarence B. Randall** was elected president of the company, succeeding **Wilfred Sykes,** who has served as president since 1941, and who was elected chairman of the executive committee. **Joseph L. Block** was elected vice chairman of the board and will also continue in his present position as vice president in charge of sales. All other officers of the company were re-elected. Membership of the board was increased from 13 to 15, with **Edward E. Brown,** chairman of the board, First National Bank of Chicago, and **Anthony M. Ryerson,** assistant to the manager of sales, Sheet & Strip Division, Inland Steel Co., elected as new directors. All other directors were re-elected. Mr. Randall became associated with Inland in 1925 as assistant vice president. He became vice president in charge of raw materials in 1930, a director in 1935, and was elected assistant to the president in October, 1948.

—o—

Wade A. Eskridge, formerly assistant district manager of oilfield territory, with headquarters at Tulsa, Okla., has been appointed service manager of Twin Disc Clutch Co., Racine, Wis. Before joining the company in 1947, Mr. Eskridge held positions with Joseph Reid Gas Engine Co., Frick-Reid Supply Corp. and Jones & Laughlin Supply Co.

—o—

Charles Lukens Huston Sr., first vice president of Lukens Steel Co., Coatesville, Pa., and in his 74th year of continuous service with the company, has been honored by the American Iron & Steel Institute, New York, for his record of long activity in the industry. Mr. Huston was elected an honorary member of the institute Apr. 13.

—o—

George B. Beitzel has been elected president, Pennsylvania Salt Mfg. Co., Philadelphia, on the eve of its 100th anniversary. Mr. Beitzel joined the company 19 years ago, and since Jan. 1, 1949, has served as executive vice president. **Leonard T. Beale,** president for the last 20 years, will continue with the company as chairman of the board. **William F. Mitchell** was elected vice president in charge of manufacturing, and **William P. Drake,** vice president in charge of sales. Mr. Drake, formerly assistant vice president of sales, assumes the position left vacant when Mr. Beitzel became executive vice president. Mr. Mitchell, assistant vice president of manufacturing, succeeds **Y. F. Hardcastle,** retired from active duty, but who remains as a director. Mr. Beitzel and **Fred C. Shanaman,** president of the West Coast subsidiary, Pennsylvania Salt Mfg. Co. of Washington, and also a vice president of the parent company, were elected to two new directorships recently created.

—o—

Roy Iverson and **Paul R. Doelz** have been elected directors of Athey Products Corp., Chicago, succeeding **Walter R. Brailsford** and **Walter R. Howell,** deceased. **W. L. Kubick,** former vice president of the company, has been elected executive vice president.

—o—

Ferro Enamel Corp., Cleveland, has appointed **Dr. G. H. McIntyre,** vice president and director of research, to head its new Central Research Division, which was organized to coordinate all corporate research activities.

—o—

Wendell Garman has been appointed personnel manager for Tinnerman Products Inc., Cleveland. He has had wide personnel experience with Harris-Seybold Co., Thompson Products Inc., and Towmotor Corp.

—o—

Walter P. Carroll has been elected a vice president, National Lead Co., New York. He is a director of the company, and manager of both the metal department and the Chicago branch. **C. F. Garesche** has been named chairman of the newly formed research control committee of the company which acts as the liaison body between the technical work, under the direction of **Alex Stewart,** and company management. Other members are **D. A. Merson** and **Harry C. Wildner,** vice presidents and directors. Mr. Garesche continues as a vice president, director, and member of the executive committee of National Lead Co. **D. W. Robertson** has been appointed general manager of the Titanium Division, succeeding Mr. Garesche. **Joseph H. Reid** is the new division manager.

—o—

Four executive changes have been announced in the St. Louis Smelting & Refining Division, National Lead Co., New York. **Gloyd M. Wiles** has been appointed division manager, succeeding **Jean McCallum,** retired. Mr. Wiles continues as chairman of the company's mining committee. **Allen R. Reiser** has been appointed assistant manager of the division. **Harold A. Krueger** was

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named plant manager of the Tri-State operations of the division, and **A. J. Yahn** was appointed plant manager of the division's Fredericktown operation. Mr. McCallum began his company career in 1918. He was appointed manager of the St. Louis Smelting & Refining Division in 1941, and in 1947 assumed general managership of the Texas Mining & Smelting Division, continuing as manager at St. Louis, also.

—o—

Frederick E. Bickel has been appointed to the sales staff of Van Huffel Tube Corp., Warren, O. He formerly was associated with Copperweld Steel Co.

—o—

A. R. Schumann, former district sales manager, has been appointed manager of sales, Standard Tube Co., Detroit, and **L. B. Boensch** has been appointed sales engineer specializing in stainless and alloy steel tubular products.

—o—

W. P. Berg and **L. A. Mertz** have been elected directors of Union Barge Line Corp., Pittsburgh, subsidiary of Dravo Corp. Mr. Berg, a vice president and director of Dravo, is general manager of the Machinery Division, and Mr. Mertz, a director, vice president and treasurer of Dravo, holds executive offices in several other subsidiaries of the firm. **L. M. Baker,** auditor of Union Barge Line Corp., was named assistant secretary and assistant treasurer of the line and of Southern Transfer Co., Memphis, Tenn., a subsidiary.

—o—

Frank B. Moran has been appointed superintendent of industrial relations of the Etna, Pa., plant, Spang-Chalfant Division of National Supply Co., Pittsburgh. A new activity of the department, that of community relations, will be supervised by **A. D. Cadenhead,** former superintendent. Mr. Moran served in the same department as assistant superintendent.

—o—

F. J. Hilsinger has been appointed works controller, Midland Works, Crucible Steel Co. of America, Pittsburgh. For the past year he has been connected with the company's Spaulding Works at Harrison, N. J., as works controller. **Alphonse J. Malone** has been appointed superintendent of the hot strip mill at the Midland Works. He formerly was associated at the South Works, Chicago, Carnegie-Illinois Steel Corp.

—o—

Edward H. York Jr., Drexel & Co., Philadelphia, has been elected to the board of directors, Alan Wood Steel Co., Philadelphia.

—o—

Charles M. Wheeler has been elected a vice president, Union Switch & Signal Co., Swissvale, Pa. He will be in charge of all district offices and sales. Associated with the company since 1927, he has been general sales manager since January.

—o—

Joseph C. Gibbons has been appointed manager of resistance wire sales for C. O. Jelliff Mfg. Corp., Southport, Conn. He formerly was connected with Wilbur B. Driver Co., Newark, N. J., as sales manager.

—o—

Denison Engineering Co., Columbus, O., has announced the appointment of **Alex M. Sneddon** to represent its multipress and other Denison hydraulic press equipment in New York.

—o—

Berton M. Sharpe has been appointed sales engineer, covering southern Indiana, southwestern Ohio and northern Kentucky, for Standard Furnace Division, Surface Combustion Corp., Toledo, O. Since joining the corporation in 1937, Mr. Sharpe has been engaged in engineering and service work in the industrial, aircraft and space-heating fields.

—o—

Walter D. Schlundt has been appointed district sales manager of New York sales district for Pittsburgh Steel Co., Pittsburgh. He became associated with the company in 1929, and has held the position of district sales manager at the company's Detroit and Pittsburgh sales offices.

—o—

Arthur B. Goetze has been elected works manager of the Tonawanda plant in Buffalo for Western Electric Co., New York, and also of the Allentown plant in Allentown, Pa. Mr. Goetze, who has been acting works manager of these plants, succeeds **William K. Wiggins,** who is retiring. Mr. Goetze has also been appointed acting works manager of the Point Breeze Works in Baltimore, temporarily replacing **John R. Shea,** who is on leave of absence.

—o—

Max M. Monroe has been appointed general manager, Aero Products Division, Dayton, O., General Motors Corp. He has been serving as acting general manager since the death of **W. J. Blanchard** in December. Mr. Monroe joined General Motors in 1923 as comptroller, Inland Mfg. Division, and in 1944 transferred to the central office in Detroit as special assistant to the vice president in charge of manufacturing. In 1946 he served as director of the industrial engineering section of the manufacturing staff, and in December of that year was appointed assistant to the vice president in charge of the Dayton and household appliance group.

—o—

Wellman Bronze & Aluminum Co., Cleveland, announces appointment of **William A. Muth Jr.** as its Ohio representative. He formerly was vice president and general manager of Aluminum Permanent Mold Co., Cleveland, and has had previous association with White Motor Co., P. A. Geier Co., and National Bronze & Aluminum Foundry Co.

—o—

E. R. Zabriskie, vice president and general sales manager, Doehler-Jarvis Corp., New York, has been elected a director and appointed a member of the executive committee of that organization, which he joined in 1921. Two new vice presidents elected are **Howard W. Bartholomew,** manager at the Pottstown, Pa., plant.

WALTER D. SCHLUNDT

WILLIAM A. MUTH JR.

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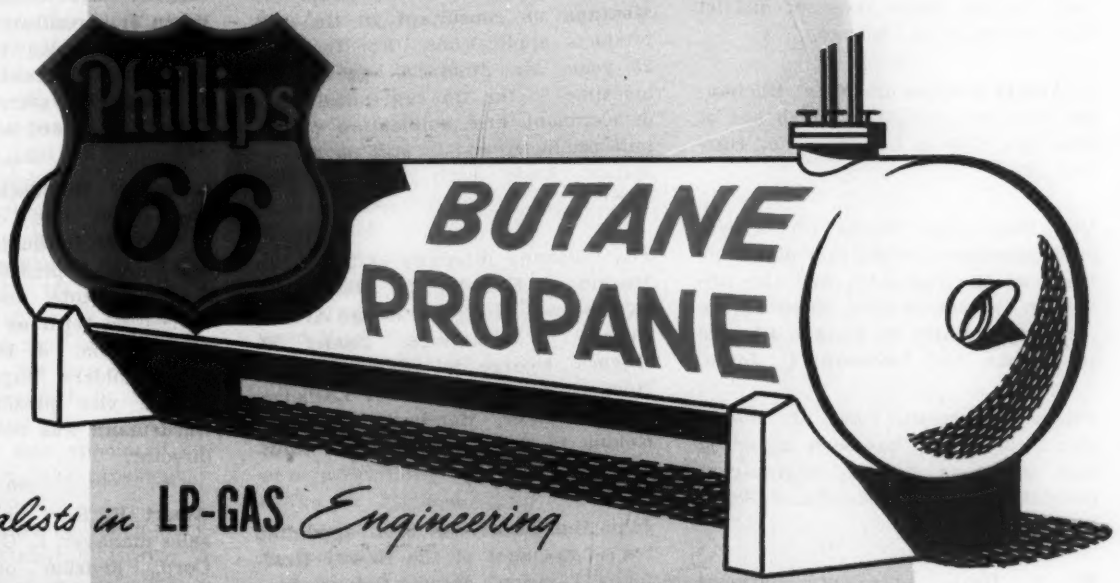

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and **Robert H. Kitzman,** manager of the corporation's two plants at Toledo, O.

—o—

Fred L. Way has been appointed sales manager of the Rust Prevention Division, Nox-Rust Chemical Corp., Chicago. For the past 20 years he has been associated with Freedom-Valvoline Oil Co., most recently as manager of its Rust Prevention Division. He will be assisted by **Robert G. Clendenin.** Other appointments at Nox-Rust are: **Carl E. Salzman,** district manager of the Chicago area, and **D. K. Blankenship,** district manager of Ohio, Indiana and portions of Michigan and Kentucky.

—o—

Ted Gravenson has been appointed sales promotion manager, Burndy Engineering Co. Inc., New York. He has been with Mayers Co., advertising agency in Los Angeles, as creative director.

—o—

Philip G. Boyd has been appointed Chicago district sales manager for Youngstown Sheet & Tube Co., succeeding the late **Arthur Purnell.** He joined the company in 1929, and served in various district offices. In 1947 he was made assistant district sales manager at Chicago.

—o—

C. Arnold Kalman and **W. C. Buchanan** have been added to the board of directors, Bliss & Laughlin Inc., Harvey, Ill.

—o—

Van Dorn Iron Works Co., Cleveland, announces re-election of all officers of the company, and the following vice presidents added to the company: **Harry D. Garber, Charles B. Bednar,** and **Lawrence C. Jones.**

—o—

Julian Lieberman, David J. Joseph Co., Birmingham, has been appointed vice chairman of the engineering committee of the Institute of Scrap Iron & Steel Inc.

—o—

W. T. Davis, president, National Screw & Mfg. Co. of California, was elected a member of the board of directors of Axelson Mfg. Co., Los Angeles.

—o—

R. J. Welke has been appointed purchasing agent, Gear Grinding Machine Co., Detroit, succeeding **M. R. King.**

—o—

Carborundum Co., Niagara Falls, N. Y., announces the following changes in district sales office personnel: **R. P. Colosi,** office manager at Buffalo, has been appointed office manager of the Cleveland district sales office to succeed **H. P. Erbe,** now office manager at Pittsburgh. **H. E. Morrill,** supervisor, branch inventories, has been named office manager at Chicago, succeeding **R. J. Nemec,** who was appointed manager at St. Louis to succeed **A. L. Fischer.** Mr. Nemec assumes his duties May 16, upon which date Mr. Fischer will be assigned an important duty with the St. Louis office organization.

—o—

R. H. Dungan has been appointed factory manager of the New Castle, Ind., plant of Chrysler Corp., succeeding **W. G. Helber,** retired. Mr. Dungan has been associated with Chrysler and its predecessor company, Maxwell Briscoe Motor Co., for the last 39 years. He has been assistant factory manager at New Castle.

—o—

Syncro Machine Co., Perth Amboy, N. J., has appointed **Jack P. Williams Jr.** as its representative in California. Previous to service in the Armed Services, Mr. Williams represented the company in Chicago.

—o—

Dumas Steel Corp., Pittsburgh, an affiliate of M. G. Dumas & Sons, announces appointment of **Louis N. Montana** as consultant in tin mill products applications. For the past 25 years Mr. Montana has devoted his time to the tin can industry on development and application of tin mill products, and is still on a consultant basis with National Can Corp.

—o—

The following directors of American Machine & Foundry Co., New York, have been re-elected: **George Arents, George S. Hastings, Daniel H. Haynes, George S. Hills, John W. Hooper, Knox Ide, C. W. LaPierre, Martin Miller, Morehead Patterson, Roland P. Soule** and **R. F. V. Stanton.**

—o—

John Burkhardt has been appointed traffic manager of the Hewitt Rest-foam Division, Hewitt-Robins Inc., Buffalo. He is also continuing in the same capacity in the Hewitt Rubber Division, where he has served for many years.

—o—

American Nickeloid Co., Peru, Ill., announces appointment of **George A. Spencer** to head its Los Angeles sales office.

—o—

W. C. Osha has been appointed plant superintendent of the Dover fabricating plant of L. O. Koven & Brother Inc., Jersey City, N. J. He previously was assistant general supervisor of welding for Pullman-Standard Car Mfg. Co., and for many years was general supervisor of welding for American Car & Foundry Co.

JAMES M. STAPLETON

Division superintendent of blast furnaces, South Chicago plant, Carnegie-Illinois Steel Corp. Noted in STEEL, Apr. 25 issue, p. 74

—o—

Wean Equipment Corp., Cleveland, announces re-election of the following directors: **S. R. Wean, R. J. Wean, R. J. Wean Jr., H. W. Lynn, D. A. McArthur,** and **J. R. Paisley.** Officers also re-elected are **R. J. Wean Jr.,** president and treasurer; **J. R. Paisley,** vice president, general manager and assistant treasurer; **G. J. Ridgeway,** secretary; and **L. R. Connor,** assistant secretary.

—o—

George R. Wernisch, manager of the steel joist and deck department, Ceco Steel Products Corp., Chicago, was elected president of the Steel Joist Institute, marking his third successive term as president of this organization. **J. D. Maitland,** Colorado Builders' Supply Co., was re-elected vice president, and **C. H. Luedemann** was re-elected managing director.

—o—

Albert F. Korf has been appointed sales manager, L. G. S. Spring Clutch Corp., division of Curtiss-Wright Corp., at Indianapolis.

—o—

P. K. Bremser has been named to head a new division of Leece-Neville Co., Cleveland, to be known as the service sales department. This department will handle all nontechnical matters pertaining to service and sales through the company's central distributor, service distributor, and authorized service station organization. In addition to Mr. Bremser the new department will include **Robert J. Fink** as merchandising manager, and **H. H. Burnham,** in charge of orders and office administration. **Robert Gray** will continue to handle all

JOHN P. FEAGLEY

Appointed district sales manager at New York, Youngstown Sheet & Tube Co., Youngstown. Noted in STEEL, Apr. 25 issue, p. 77

MAURICE J. MAHONEY

Elected secretary of Copperweld Steel Co., Glassport, Pa. Noted in STEEL, Apr. 18 issue, p. 79

JOHN P. AHERN

Elected executive director, National Foundry Association, Chicago. Noted in STEEL, Apr. 4 issue, p. 92

technical matters, including warranty adjustments, which comprises a separate department. **Harold J. Zuske** has been named to head original equipment sales for the company, and succeeds **Kenneth C. Gano,** resigned.

—o—

Paul V. Shields has been elected to the newly created office of chairman and chief executive officer of Curtiss-Wright Corp., New York. **Guy W. Vaughan** retired from the chairmanship of the board. **W. C. Jordan,** who assumed the presidency when Mr. Vaughan vacated that office in December, has resigned.

—o—

A. M. Wiggins has been named vice president, Westinghouse Air Brake Co., Wilmerding, Pa. He started with the company in 1933 as a patent attorney and in 1938 took charge of its legal department. He was elected an assistant vice president in 1945 in charge of legal and patent matters, and a year later was appointed executive assistant to the president.

—o—

Louis O. Klingelhofer has been elected president, Pittsburgh Bridge & Iron Works, Pittsburgh, succeeding **E. K. Klingelhofer,** who was elected chairman of the board. **R. Wade Bowman,** formerly vice president in charge of sales, was elected executive vice president, and **Fuller F. Ross,** vice president and treasurer. **H. N. Trimble** was re-elected vice president.

—o—

The following were named directors for a four-year term by Westinghouse Electric Corp., Pittsburgh: **G. H. Bucher,** vice chairman, Westinghouse Electric Corp.; **A. W. Page,** industrial consultant, New York; **W. C. Robinson,** president, National Electric Products Corp., Pittsburgh; and **R. T. Swaine,** partner in the law firm of Cravath, Swaine & Moore, New York. **Roscoe Seybold,** Westinghouse vice president, was elected a director for a term of three years, and **Edward Hopkinson Jr.,** partner in Drexel & Co., Philadelphia, was named a director for one year.

—o—

R. E. Whittenberg has been appointed superintendent of the Birmingham works of Harbison-Walker Refractories Co., Pittsburgh. He succeeds **S. A. Cattlett,** who was named district superintendent of the Olive Hill, Ky., and Portsmouth, O., plants. Mr. Whittenberg has been assistant superintendent at Birmingham since 1935.

—o—

George A. Hays Jr. has been named director of market development, Oil Well Supply Co., Dallas, subsidiary of United States Steel Corp. His headquarters will be at Tulsa, Okla. Mr. Hays was connected with Wilson-Snyder Mfg. Division and its parent company, Oil Well Supply, for 24 years prior to October, 1947, when he resigned to become associated with Hinderliter Tool Co. at Tulsa.

—o—

Wire Association, Stamford, Conn., announces election of the following officers for the ensuing year: President, **L. D. Seymour,** Wire Mills Division, John A. Roebling's Sons Co., Roebling, N. Y.; vice presidents, **F. M. Crapo,** president, Indiana Steel & Wire Co., Muncie, Ind., and **R. B. Roth,** vice president and purchasing agent, Ludlow-Saylor Wire Co., St. Louis; secretary-treasurer, **R. E. Brown,** editor and publisher, *Wire & Wire Products,* Stamford.

OBITUARIES . . .

Frederick H. Deknatel, 84, board chairman, Mackie Lovejoy Mfg. Co., maker of hardware specialties, Chicago, died Apr. 15.

—o—

Fred J. Page, 38, accountant and comptroller, Kiekhaefer Aeromarine Motors Inc., Fond du Lac, Wis., died Apr. 19.

—o—

Lloyd W. Sanborn, 75, retired director and secretary, Bruce-Macbeth Engine Co., Cleveland, died in New Smyrna Beach, Fla., recently.

—o—

Harry L. Coon, 51, president, Pacific Crane & Rigging Co., died in Los Angeles Apr. 13.

—o—

Col. Harry H. Stout, 76, retired Army officer and former chief metallurgist for Phelps Dodge Copper Products Corp., New York, died Apr. 13.

—o—

William G. Bray, 63, assistant superintendent, Harrison, N. J., plant of Otis Elevator Co., died at his home in Yonkers, N. Y., Apr. 25.

—o—

W. F. Wissman, 65, retired vice president, Motch & Merryweather Machinery Co., Cleveland, died Apr. 22.

—o—

John G. White, 65, retired vice president, Dulien Steel Products Inc., Seattle, died Apr. 20.

—o—

Eber C. Sherman, 60, president, Sherman Tractor & Equipment Co., Mt. Vernon, N. Y., died Apr. 22.

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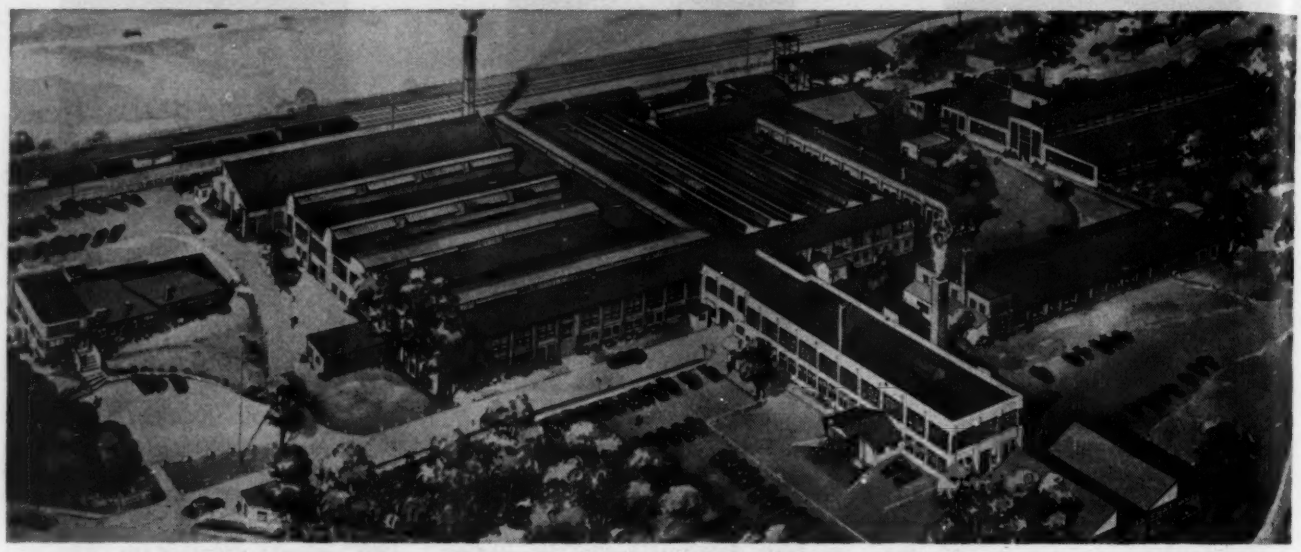

Factory headquarters and general offices of The Cleveland Chain & Mfg. Co., and its associate, David Round & Son, Cleveland, Ohio. Similar plants are operated by associate companies in Bridgeport, Conn.; Seattle, Wash.; So. San Francisco, Cal., and Trenton, N. J.

SIX plants of The Cleveland Chain & Mfg. Co. and its associate concerns produce chain of every type . . . to meet every home, farm, automotive and industrial chain need.

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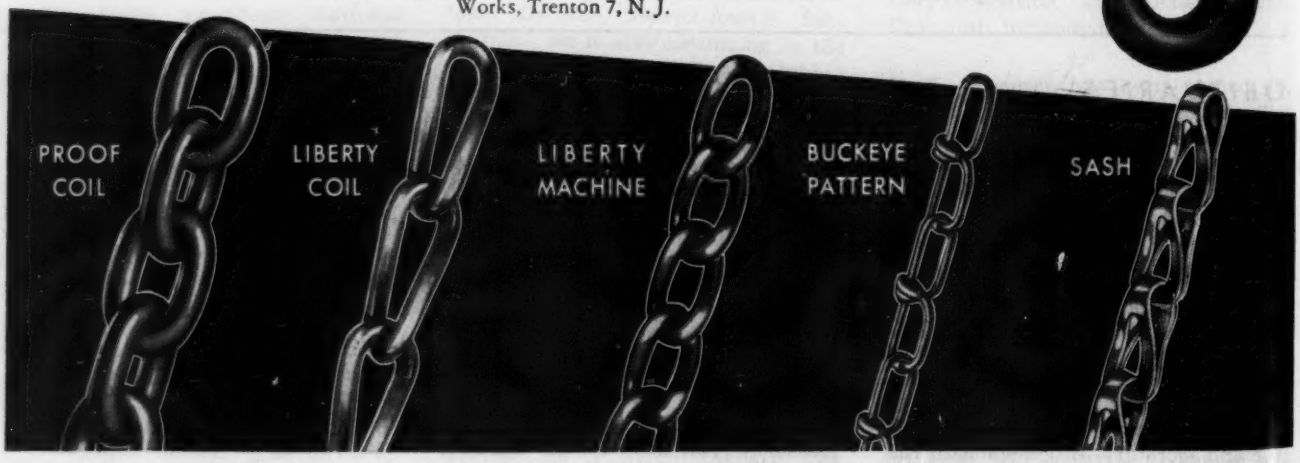


Engineering News . . . AT A GLANCE

IMPROVES PAINT COLOR— When added to coating materials, a thin colorless silicone liquid developed by General Electric Co., Pittsfield, Mass., is reported to provide more uniformity to finished surfaces on machines and other allied industrial equipment. The liquid, which is included in portions of one part to 10,000, eliminates separation of finish pigments. It is most effective when mixed with paint ingredients at time of manufacture.

FOAM INSULATION— An effective plastic insulating material that fills large areas, yet weighs almost nothing, was developed recently by a chemist in the research lab of Westinghouse Electric Corp., Pittsburgh. A liquid resin that expands 100 times its original volume when baked at about 350° F, the material is resistant to fire, moisture, fungus growth and insects. It is low enough in cost to be practical for many applications. When foamed in prefabricated metal wall sections, for example, a 2-inch thick layer weighing only 300 pounds is sufficient to insulate a complete 6-room house. The "foam" is currently being tested for use in refrigerators. Both shipbuilding and aircraft industries may find the new material acceptable for many uses.

TWISTS FULL-SIZE BRIDGE SECTIONS— Torsional behavior of structural members such as plate and box girders is to be studied with the aid of a 2 million pound-inch torsion testing machine, recently proof-tested at the Fritz Engineering Laboratory of the Civil Engineering Department, Lehigh University, Bethlehem, Pa. The machine which accommodates specimens 4 feet, 4 inches in diameter and 16 feet long, is capable of handling full-size bridge sections, twisting them through any desired angle. Machine itself is about 9 feet high and 25 feet long. Its gross weight is 15 tons.

UNCORRODIBLE METAL— Titanium metal is practically unaffected by exposure to sea water or marine atmosphere, according to test data obtained at Kure Beach, N. C., by Remington Arms Co. Inc., Bridgeport, Conn. Tests, which were conducted on a comparative basis with other metals extensively used in structural applications indicated that none of the standard metals approached the corrosion resistant properties of titanium. Remington also reports that wet chlorine gas, hot chromic acid and hot ferric chloride solutions are not corrosive to the new metal.

"ROLLING" WASHERS"— Huge steel "washers", 1-inch thick make up the whirl chamber employed by Pratt & Whitney, East Hartford, Conn., to test turbine rotors used in jet aircraft. Sixty of these washers, weighing ½-ton each, rest on their edges in a horizontal stack 5 feet long forming a cylindrical chamber 8 feet in diameter in which the rotors are whirled by hot gases at temperatures up to 1600°. Since the outer diameter of the washers is 10 feet, this means the chamber's washers are 1 foot thick. Thus any piece of metal thrown from the spinning wheel would be forced to penetrate 12 inches of solid steel. Furthermore the heavy washers literally roll with the impact of any flying missile. While apparently jammed so tightly together to make a solid cylinder of metal, the only thing that keeps the washers from either rising or rolling is their own weight.

ELECTRODE FOR MELTING — Titanium powder, not previously compacted, sinters into a fairly strong body when heated at 1600 to 1800° F, according to researchers at Battelle Memorial Institute, Columbus. This, it was found, provides a simple means of making consumable electrodes for arc melting refractory alloys. If titanium powder is high in hydrogen content and of fine particle size, it tends to blow apart during melting. (p.82)

ROTARY HEATING—Besides saving floor space and providing greater flexibility, rotary heat treating method used currently by several automotive plants indexes the work through 360 degrees to assure equalized treatment. This uniform processing, it is pointed out, produces very little warpage of the work. For example, in heat treating one type of shaft, warpage had to be held to 0.003-inch. With the method formerly used the shafts warped excessively and required straightening. The newer method, however, reduced warpage to 0.002-inch—well below the specified limit—eliminating the straightening procedure. (p.87)

CO-ORDINATED OPERATION — Beneficial returns on modernized materials handling methods in metalworking plants can be expected only in proportion to actual plant needs, and care exercised in making a preliminary analysis of the problem. Possible overhead savings also depend on final selection of equipment to fill requirements. Best results, it is pointed out, come about from a co-ordinated approach that combines technical, economic and human factors. (p.89).

"BY-PRODUCT" COMPLEX—Severe shortage of metallurgical coke and poor quality available offered the coke industry a definite incentive to build new ovens during the post-war years. As a result the past year saw plans laid and actual construction completed of more ovens than at any time in the preceding 25 years. Boom in coke oven construction took place despite fact that construction costs for each installation amounted to 2½ times that of a similar unit in 1939. Furthermore young blood is being brought into the industry for specialized training. "By-product" complex that served to hold back the industry is gradually being eliminated. (p.94)

NEWS ENG ENGINEER NEWS ENG ENGINEER NEWS ENG ENGINEER

By S. A. HERRES and J. A. DAVIS
Metallurgists
Battelle Memorial Institute
Columbus

Arc Melting Refractory Metals

A simple laboratory arc melting furnace which is being used for experimental investigation of alloys of titanium, zirconium, chromium, molybdenum or tungsten is described by the authors. Furnace consists of an enclosed water-jacketed copper crucible and a vertically movable, water-cooled, tungsten-tipped electrode. Arc current is supplied by one or more welding generators

PRODUCTION of satisfactory chromium, molybdenum, titanium, zirconium, or tungsten-base alloys by melting requires: Use of nonreactive containers for handling the molten metals; avoidance of reactive atmospheres during melting and casting; and in some instances, addition of elements which remove contaminants as innocuous compounds.

Certain chromium-base alloys have been prepared on an experimental scale by induction-furnace melting in beryllium oxide crucibles under vacuum. The Bureau of Mines is presently melting zirconium in a graphite resistor furnace where the zirconium is melted in a graphite crucible and cast into graphite molds, all under vacuum.[1] Under these conditions, the zirconium picks up between 0.15 and 0.20 per cent carbon from the graphite crucible and mold. It is reported that deoxidation of the ziconium in vacuo by carbon does not occur, but this amount of carbon pickup does not appear to be detrimental to the mechanical properties.

Titanium melted in carbon picks up ½ per cent or more carbon, and this is not without some detriment to the properties. None of the ceramic oxides which are commonly used for furnace crucibles appears to offer much promise for melting ductile alloys of titanium, zirconium, molybdenum, or tungsten. Dissociation, wetting, or chemical reactions between the ceramic oxide and the melt occur at the melting temperatures of these metals and contaminate the melt with oxygen and often with the metal from the reduced oxide. The usual result is extreme hardening and embrittlement of the product.

Electric-Arc Melting—At the present time, the principle of electric-arc melting in an enclosed furnace with a water-cooled copper crucible and controlled atmosphere is being utilized for investigation and experimental production of refractory alloys. The metals do not wet or weld to the water-cooled copper and, therefore, contamination from the container is avoided.

As early as 1903, W. von Bolten arc melted buttons of tantalum which were worked into rod and drawn into wire for use in the first commercial metallic filament lamps.[2] Tantalum powder was pressed into a stick and used as a consumable electrode, which was melted on the top of a water-cooled copper table within a large evacuated glass globe immersed in water.

Kroll and others[3, 4] melted buttons of titanium, zirconium, and similar metals using modifications of

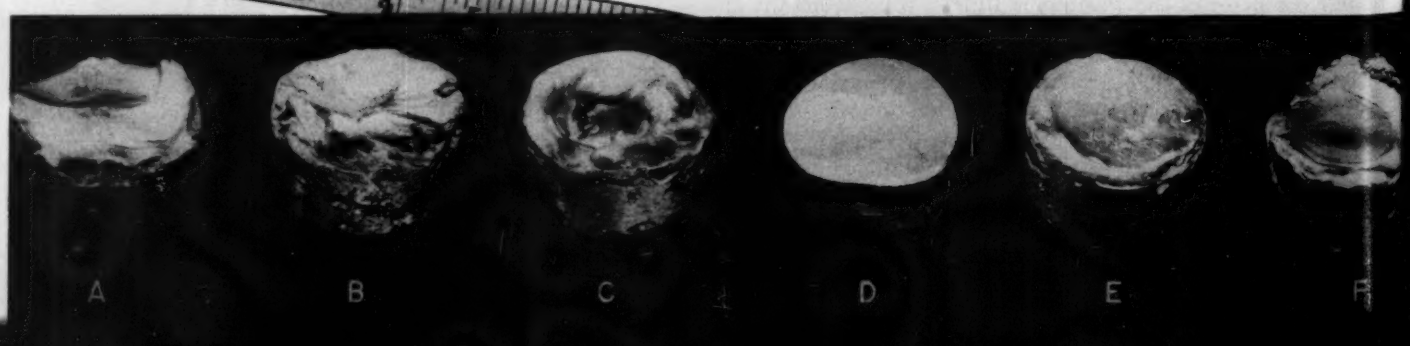
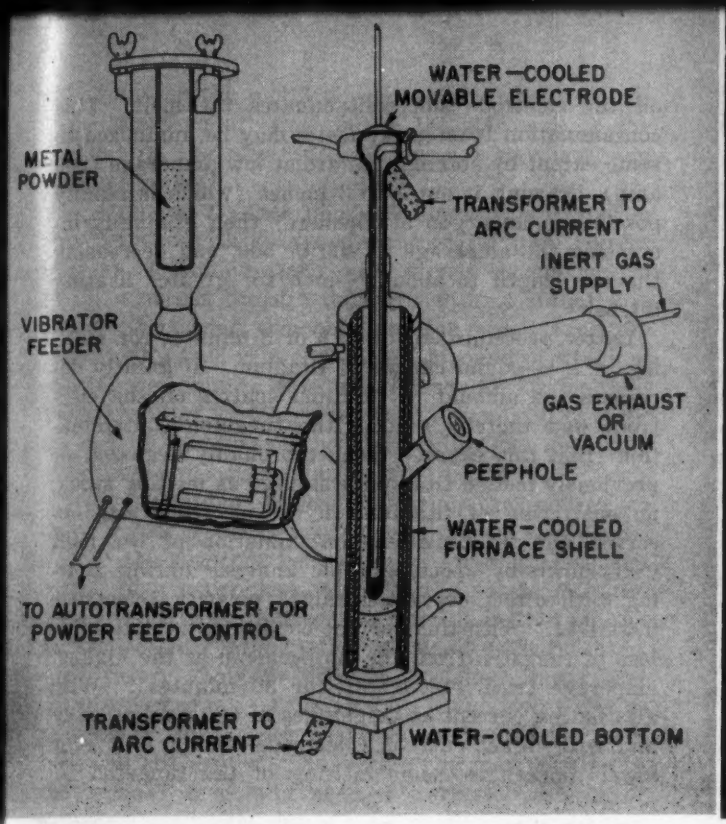


Fig. 2—Typical arc-melted refractory alloys. A, 20W-80Mo; B, 40W-60Mo; C, 60W-40Mo; D, 80Cr-20Mo; E, 60Cr-40Mo; F, 20Cr-80Mo; G, 99.75Cr-0.25Al; H, 99.5Cr-0.5Al; I, 99Cr-1.0Ti



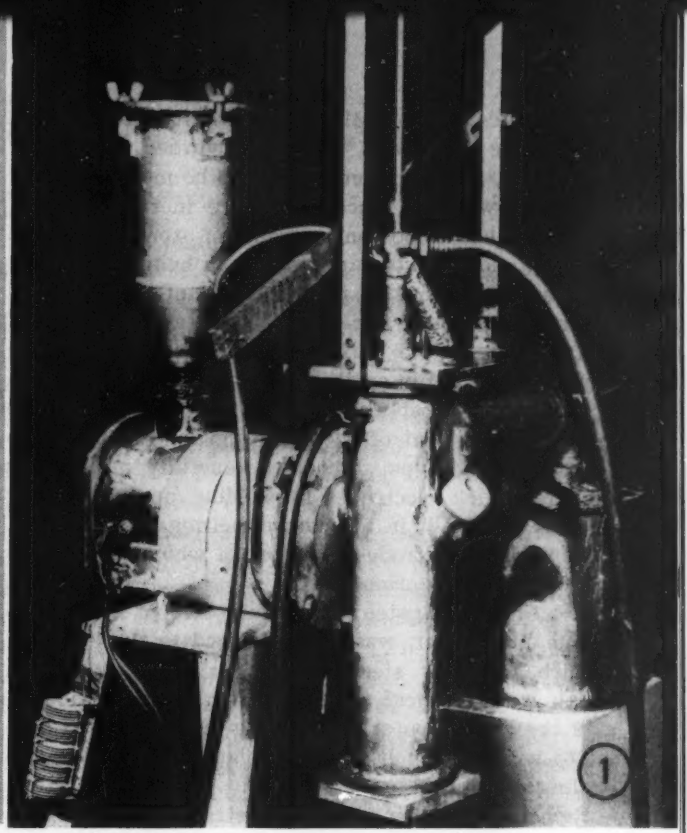


Fig. 1—Modified arc melting furnace

this apparatus. The various modifications included substitution of an inert tungsten electrode for the consumable electrode and sometimes of carbon or other metals and refractories for the water-cooled copper table or crucible. In a recent article, Kroll and co-workers[5] discussed several difficulties anticipated for arc melting of large ingots of zirconium, for which they favored the graphite resistor furnace. They encountered pitting of the copper crucible when the arc was struck on it and substituted a lower electrode of iron with a tungsten plate brazed on top which worked fairly well.

Apparently, Kroll did not attempt to build up an ingot using a water-cooled copper crucible as the lower electrode. Other difficulties were with electrode and arc characteristics which may be overcome as discussed below.

"Electric Ingot" Process—M. W. Kellogg Co. developed the "electric ingot" process during the past 12 years for the production of special high-alloy steels.[6] Considerable tonnages of stainless steel and tool steels were produced by this process during the war years. Fig. 4 is a schematic sketch which illustrates this novel process. The water-cooled mold serves as the bottom electrode. The other electrode is the tube formed from metal strip. Alloying ingredients and flux fall from the feeding tube into the arc and are melted along with the tube. Ingots up to 6 feet long are made. Alloys made by the process are reported to be of exceptionally high quality with practically no chemical segregation or internal porosity.

Molybdenum ingots, 3 to 4 inches in diameter and weighing up to 60 pounds, are being produced by a vacuum arc-melting process developed at the Climax Molybdenum Corp.'s laboratory during the past 5 years.[7] Fig. 3 is a schematic drawing of this apparatus. A consumable electrode is made from molybdenum powder, continuously during melting, by means of a collet pressing arrangement and electric-resistance sintering. The ingot is formed by melting the consumable electrode into a water-cooled copper crucible which is the lower electrode. At present, the consumable electrode is 1 inch in diameter and is melted with about 3200 amp and 32 v ac. The process is obviously capable of expansion for greater production.

Climax investigators found that commercial grades of molybdenum powder, which was satisfactory for powder metallurgy processing, require further deoxidation to give arc-melted ingots which are forgeable. Reduction of the oxygen content to below 0.0025 per cent was required and was accomplished simply by adding carbon to the electrode and removing oxygen as carbon monoxide during melting under a moderately high vacuum. A slight excess of carbon (up to 0.06 per cent) does not impair the forgeability of molybdenum.

The remainder of this paper describes work on arc melting of refractory alloys which has been in progress at Battelle Memorial Institute since January, 1947.

Tungsten-Tipped Electrodes — For the purpose of evaluating the properties of a number of different alloys, arc melting with an inert electrode is highly de-

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sirable since this obviates the necessity of providing consumable electrodes, made by powder metallurgy processing, for each composition to be melted.

Several welding processes utilize inert electrodes. These include carbon-arc welding, atomic-hydrogen welding, and tungsten-arc welding in helium or argon. The rapid reactions of molten alloys of titanium and chromium with oxygen and nitrogen and the lack of suitable protective flux covers require that these metals be melted in enclosed containers under vacuum or inert-gas atmosphere.

The intense heat of such melting appears to be too severe for the type of cooling generally utilized for tungsten stick electrodes in welding applications or as used by Kroll[3] in his button-melting furnace. Fig. 7 shows the electrode construction which was adopted after some experimentation.

A piece of tungsten rod, obtained from a commercial manufacturer, was nickel brazed to the end of a ¾-inch diameter steel pipe and then ground to a rough hemispherical shape. A small copper tube inside the steel pipe and extending from the water inlet to within ¼-inch of the tungsten provided water-cooling of the tip.

Remainder of the furnace illustrated in Fig. 7 was constructed of copper with silver-soldered joints, except for the electrode seal which consisted of a steel housing containing two Victor oil seals held firmly in place with a threaded insert. Electrical insulation was obtained by a rubber gasket between the top and side walls of the furnace which was held together by bolts or C clamps suitably insulated. A rubber gasket was also used between the side walls and the bottom to obtain a gas tight seal.

Commercially obtainable tank argon of 99.6 to 99.8 per cent purity provided a suitable atmosphere in which the arc was very stable. A slight positive pressure of argon in the melting furnace is advantageous in avoiding difficulty with small leaks which would be serious in vacuum melting.

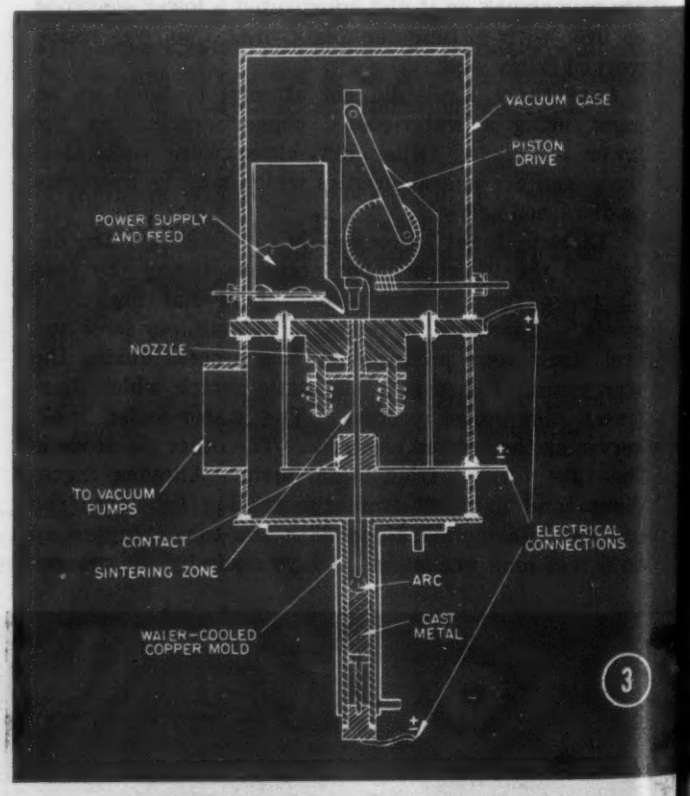
This furnace is suited for melting pancake-shaped ingots by a batch operation where the furnace top is removed before adding a charge. From ⅛ to 1 pound, depending on the nature and composition of the charge, may be melted at one time. Metals ranging from magnesium to tungsten in melting point and various intermetallic and nonmetallic compounds have been melted in this apparatus.

Power for Melting—Power for melting is supplied by a welding-type generator, or two generators in parallel, operating at 400 to 700 amp for 1 to 10 minutes, depending on the characteristics of the charge, with 70 v open circuit and 20 to 30 v across the arc during melting. The correct melting time and amperage are judged by experience and are generally not critical except that too great overheating may cause attack on the copper crucible.

The electrode is vertically movable and the arc is established by moving it down to the charge. Melting stock which is excessively gassy, such as acid-leached chromium or titanium powder, may cause violent boiling and spattering during melting. Spattering of these melts on the tungsten electrode tip causes formation of a low-melting alloy which drips off the electrode and contaminates the melt. This contamination from gassy melts may be minimized to some extent by starting the arc at low amperage (200 amp), drawing it out 2 to 3 inches (which is readily possible in an argon atmopshere) then gradually increasing the amperage to 400 or 500, and decreasing the arc length to about ½-inch for greater heating intensity.

Latter procedure requires 2 or 3 minutes for melting of a ¼-pound charge of titanium. It greatly decreases the amount of titanium spatter on the electrode and thereby reduces the tungsten contamination from this cause. When thoroughly degassed or previously melted titanium was used as melting stock, no spattering of titanium on the electrode was observed and no tungsten contamination of the melt was shown by spectrographic analysis during melting with direct current, straight polarity (electrode negative). With this current condition, no noticeable loss of tungsten from the tip occurred at the highest amperage tried (1200 amp for 30 minutes). With alternating current at amperages of 600 amp or more and with direct current (electrode positive) at even lower amperages, some melting of the tungsten tip occurred.

Modified Furnace — Fig. 1 shows an arc-melting furnace modified for introducing metal powder into the crucible from a sealed hopper during melting. A number of titanium ingots, 2½ inches in diameter and weighing up to 4½ pounds, were made in this furnace, using titanium powder produced by the Bureau of Mines as a starting material. Attempts to melt 1½ or 2-inch diameter ingots were unsuccessful because there was insufficient clearance between the ¾-inch diameter electrode and the crucible walls to prevent occasional arcing from the electrode to the



side walls as the metal powder was fed between the two. Such an arc may pierce the side wall of the crucible or the electrode, causing a water leak and spoiling the melt.

A series of 2½-inch diameter ingots was melted in this furnace with an arc current of 700 amp (direct current, electrode negative), 70 v open circuit, and 20 to 30 v across the arc during melting. About 0.2-pound of powder was put into the crucible at the start, and a feed rate of 0.15 to 0.2-pound of titanium powder per minute was maintained during melting. Tank argon of 99.6 per cent purity was used to flush air out of the furnace before melting and an argon atmosphere was maintained while melting.

Heavy Titanium Deposit — During the melting of these ingots, a heavy coating of titanium was deposited on the electrode because of severe spattering due to the high hydrogen content of the powder. If the powder feed was stopped, the deposit melted off the electrode and contaminated the ingot. Therefore, a very careful balance between the heat input and powder-feed rate was necessary. If too low power in relation to the powder feed was used, the ingot surface was not melted. If too high power in relation to the powder feed was used, a variable amount of tungsten was picked up.

By carefully regulating the melting rate, it was possible to melt titanium ingots which analyzed less than 0.01 per cent tungsten. Analysis of other elements before and after melting was as follows:

	Mg, %	Fe, %	C, %	N, %	H, %
Bureau of Mines powder	0.46	0.14	0.02	0.023	0.11
Arc-melted ingot	0.15	0.14	0.02	0.028	0.04

No reliable analysis figures for oxygen are available. Mechanical properties of an ingot heated to 1950° F and hot forged without protection from the air were 92,000 psi tensile strength, 72,000 psi yield strength, 27 per cent elongation in 1-inch gage, and 47 per cent reduction of area. Hardness was 190 Brinell. The figures for strength, hardness and ductility are all slightly higher than the values reported by the Bureau of Mines for bars prepared by powder metallurgy methods from the same base.[8]

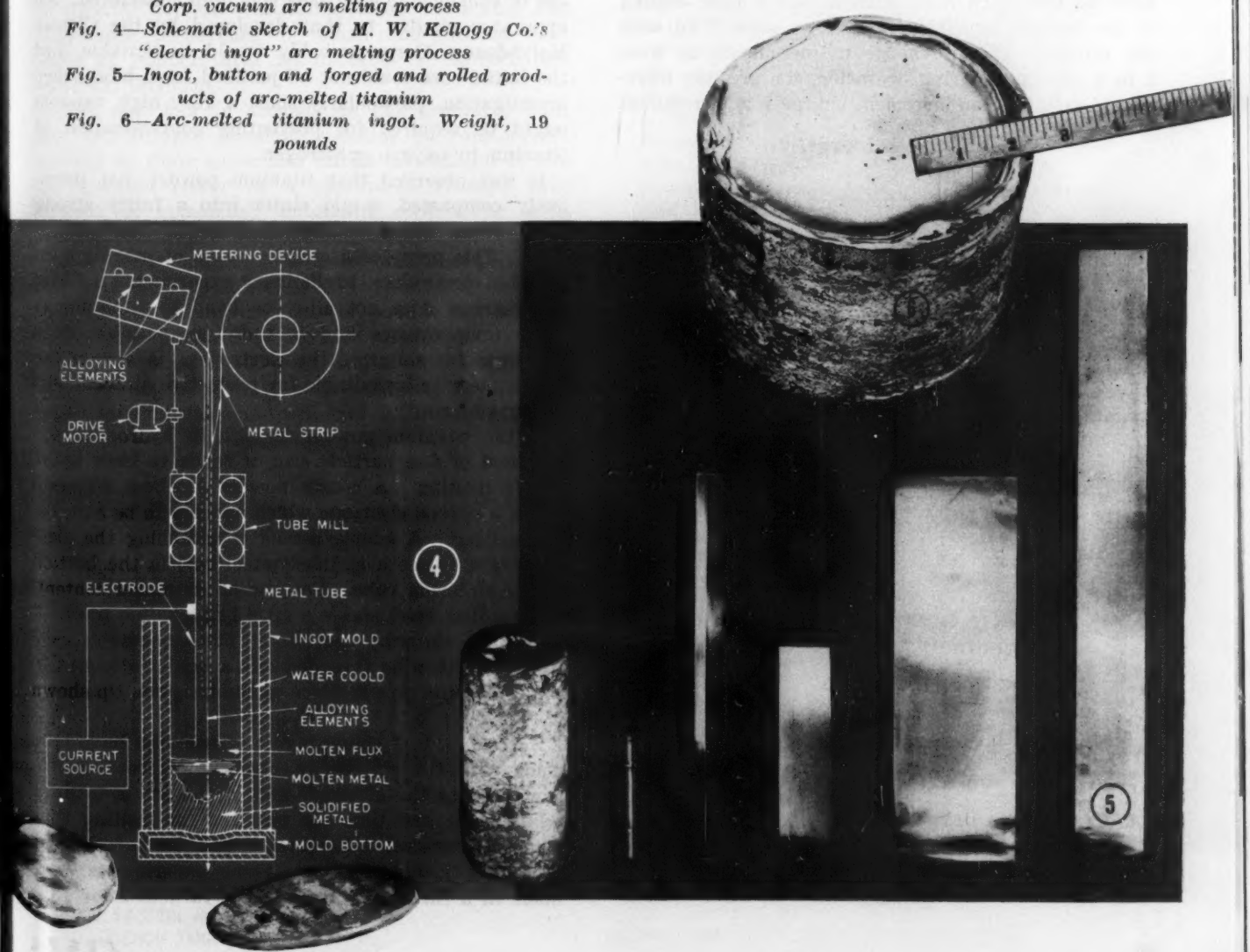
Titanium is hardened and strengthened by nitrogen and oxygen added to the melt or absorbed at any time during processing. No addition agents for removing or counteracting the effects of oxygen or nitrogen in titanium are known. An ingot was melted from 1 pound of titanium powder which had been degassed under vacuum at 1600° F. Neither spattering on the electrode nor tungsten contamination occurred during melting; however, there was some pick-up of oxygen and nitrogen during the degassing operation so that the tensile strength of this metal after hot forging was increased to 118,000 psi with 32 per cent elongation.

Fig. 3—Schematic sketch of Climax Molybdenum Corp. vacuum arc melting process

Fig. 4—Schematic sketch of M. W. Kellogg Co.'s "electric ingot" arc melting process

Fig. 5—Ingot, button and forged and rolled products of arc-melted titanium

Fig. 6—Arc-melted titanium ingot. Weight, 19 pounds



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Case Hardening Anticipated — Case hardening of titanium by oxygen or nitrogen absorption during hot working might also be anticipated. On 2 hours exposure of a titanium bar in air at 1950° F, a maximum surface hardening of 500 Vickers-Brinell hardness occurred which gradually dropped off to the original hardness of 250 Vickers-Brinell 0.1-inch below the surface. Excessive surface hardening during hot working may be avoided by rolling titanium at the lower range of its working temperature. An arc-melted titanium ingot finish rolled at 1450° F to 0.2-inch sheet gave a tensile strength of 130,000 psi with 12 per cent elongation when tested without grinding the hot-rolled surface. Preliminary experiments indicate that arc-melted zirconium suffers much more severe attack during hot working in air than does titanium.

Fig. 5 is a photograph showing a ½-pound pancake ingot made by batch melting, a 4-pound ingot which was made in the furnace illustrated in Fig. 1, and forged and rolled products from similar titanium ingots.

Difficulty would be anticipated in uniformly mixing and feeding alloyed charges with the vibrator-feeder device. Accordingly, a furnace was constructed similar to that shown in Fig. 1 except that an intermittent feeding device was used in place of the vibrator feeder. This consisted of an enclosed cylinder with eight concentric holes which could be rotated so that each hole indexed over a tube leading to the furnace crucible. The holes were filled with the properly alloyed charge in increments to total 1 to 2 pounds. During operation, the arc was interrupted each time an increment charge was introduced.

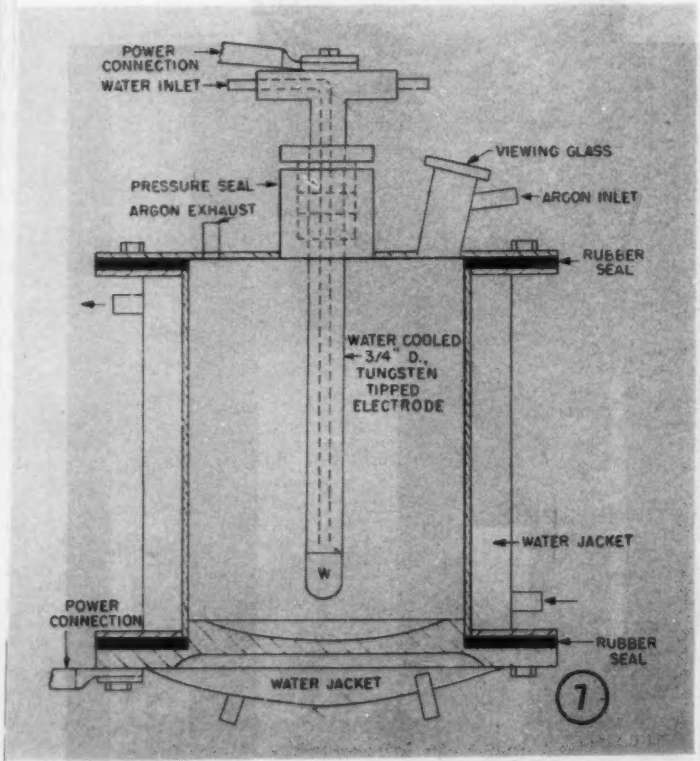


Fig. 7 — Experimental water-cooled arc melting furnace

A large number of titanium-base alloy ingots were made in this furnace. The following properties for hot-forged bars are illustrative of those obtained in preliminary work using Bureau of Mines titanium powder as a base material: 198,000 psi tensile strength with 2 per cent elongation and 169,000 psi tensile strength with 11 per cent elongation.

Some experiments were made on the melting of high-purity titanium prepared at Battelle by the decomposition of titanium iodide on a hot filament.[9] These melts were made in a small-batch melting furnace of the type illustrated in Fig. 7. Preliminary to melting, hot water was circulated through the water jacket while the furnace and charge were degassed with a vacuum pump operating through a mercury seal. The tank argon used for a melting atmosphere was purified by passing it through a column of titanium chips held in a quartz tube which was heated to 1600° F by an external resistance coil of nichrome wire. Under these conditions, the total increase in hardness during three remeltings of the iodide titanium was two points Rockwell B.

Fig. 2 is a photograph of several chromium, molybdenum, and tungsten-base ingots arc melted in a manner similar to that described for titanium alloy ingots. No data on the hot workability or properties of these alloys are available.

Consumable Electrodes—In order to avoid tungsten contamination during melting of gassy titanium, the use of consumable electrodes has been considered. An apparatus similar to that developed by the Climax Molybdenum Corp. probably would be suitable, but the initial cost could not be justified for a laboratory investigation, particularly since a very high vacuum might be required for preventing contamination of titanium by oxygen or nitrogen.

It was observed that titanium powder, not previously compacted, would sinter into a fairly strong body when heated at 1600 to 1800° F for a short time. This provides a simple means of making consumable electrodes. Preliminary experiments indicate that carbon does not alloy or bond to titanium at these temperatures and is therefore suitable as a container for sintering the electrodes. Argon or helium appear to be suitable for protective atmospheres during sintering.

If the titanium powder is high in hydrogen content and of fine particle size, it tends to blow apart during melting. A coarse powder of about 10 mesh forms a porous electrode which appears to be suitable for melting. A simple means of attaching the electrode is to place a stainless steel bolt in the bottom of the sintering tube. Because of its nickel content, the stainless steel makes a good braze to the titanium during the sintering operation. The consumable electrode may then be threaded into a holder attached to the end of the pipe in place of the tungsten tip shown in Fig. 5.

Several ½ to 1-pound ingots of titanium have been made with the sintered electrodes. Since the heat generated at the electrode end of the arc is utilized, less current and time are required for melting than when a water-cooled, tungsten-tipped electrode is used.

Melting Larger Ingots — Some experiments were made in a furnace of the (*Please turn to Page* 135)

ROTARY Heat Treating Method

. . . reduces floor space requirements and provides greater operating flexibility

By WALTER H. HOLCROFT
Vice President and Technical Director
and
EDWARD C. BAYER
Metallurgical Engineer
Holcroft & Co.
Detroit

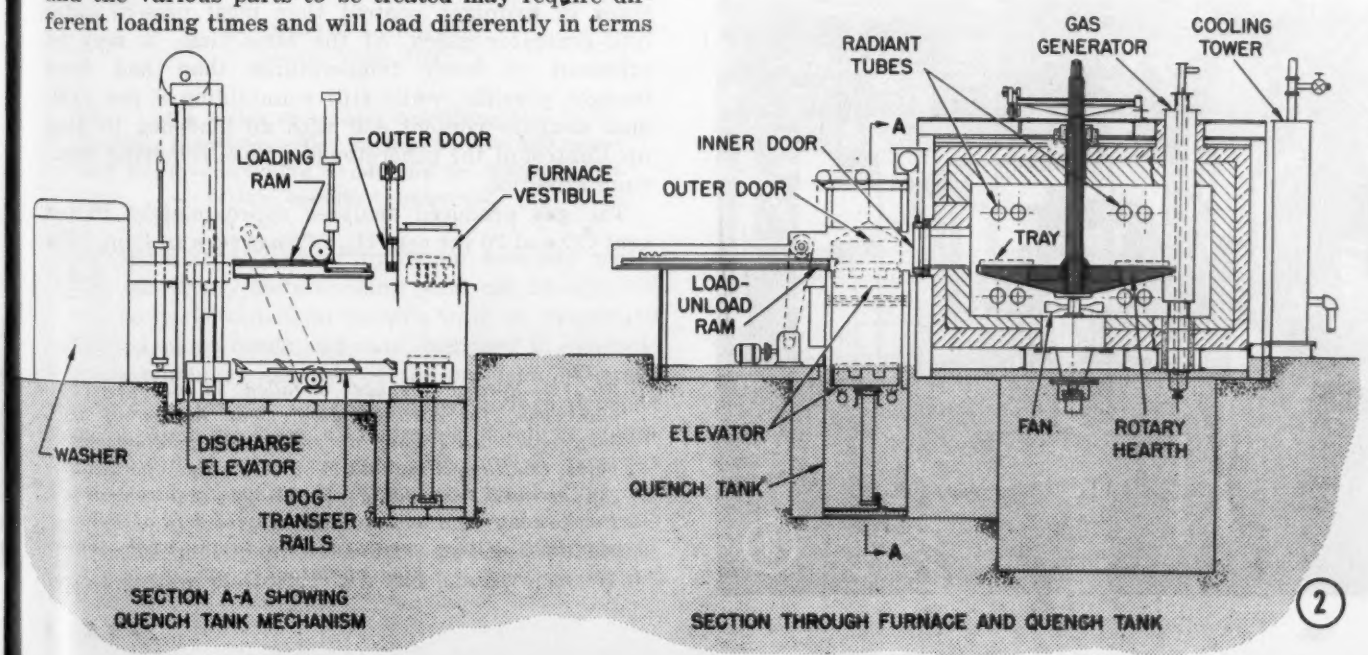
UNUSUAL compactness and flexibility of operation are among the advantages offered by a controlled-atmosphere rotary heat treat furnace recently placed in operation in automotive plants—three heated by gas and one by electric radiant tubes. Parts treated by the above installations include tubular spacers, cams, brackets and shafts. Washers and other flat parts are also treated successfully by proper placing in the work trays so that all surfaces will be exposed to the furnace atmosphere. Designed for use where volume of work is less than would require a pusher-type or conveyor-type furnace, the furnace is suitable for carbonitriding, clean hardening and deep case carburizing of small and medium-sized parts at temperatures up to 1700° F. Quench and wash are included.

This unit has an atmosphere gas generator built into the furnace housing, resulting in considerable savings in floor space and initial investment. It can be operated either as a continuous furnace with manual or completely automatic control, or as a batch-type furnace with manual control.

In a furnace adaptable to many heat treat processes and to treatment of widely-varied parts, it is easily seen that a rating in terms of pounds per hour is not a true measure of furnace capacity; for each process requires a different length of time at heat, and the various parts to be treated may require different loading times and will load differently in terms

Fig. 1—Unretouched photo of typical parts heat-treated in the rotary furnace

Fig. 2—Sectional drawing of rotary furnace, including automatic quench and wash. Gas generator is built into furnace and discharges directly into work chamber. Furnace is heated by gas-fired radiant tubes with closed-head burners which maintain constant gas-air ratio, or by electrically-heated radiant tubes



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of pounds per square foot. For instance, one furnace has a production capacity of 200 pounds per hour in carbonitriding small hydraulic pistons to a case depth of 0.020-inch in 2½ hours at 1550° F, while an identical furnace handles 1000 pounds per hour in carbonitriding miscellaneous automotive parts to a depth of 0.005-inch in 1 hour at 1550° F. Thus, a true comparison of furnace capacities can only be made on the basis of working load and hearth area. This rotary furnace has a hearth loading area of 18 square feet and takes a maximum load of 1800 pounds.

Automatic Operation—Under continuous automatic operation, the operator merely places a loaded tray of work in front of the vestibule door and presses the "load" button when a signal light goes on. All subsequent operations are performed automatically under control of a cycle timer, as follows:

When the "load" button is pressed, the outer door opens and a hydraulic loading ram (see Fig. 2) pushes the tray into the vestibule and withdraws. The outer door then closes, and the vestibule is thoroughly flushed with gas from the furnace chamber.

When the cycle timer makes contact, inner door opens and the tray is pushed onto the rotary hearth by a motor-driven ram. The hearth then indexes one position, bringing a tray of treated work beneath the ram; the ram pulling the tray out onto the vestibule elevator. The inner door then closes and the elevator carries the tray down into the quench tank, where work is quenched in oil under forced circulation.

Dog transfer rails move the tray to the first of two "rest" positions in the quench tank, and at the same time move a tray onto the discharge elevator in the other end of the tank. The discharge elevator then comes up, and the tray of stock is pushed onto the wash elevator—either automatically or by hand. Either a spray washer or automatic dip-type washer can be provided.

Batch-Type Operation—In many cases, where relatively small production is required, it is desirable to omit the continuous operation feature and use the unit as a semi-batch type furnace. Operated in this way, with the loading mechanisms under pushbutton control, the furnace can be completely loaded with untreated stock in approximately 10 minutes. The furnace hearth can then be set to index automatically at regular intervals to insure equalized heat treatment of all parts. When treatment is completed, the furnace is unloaded and stock quenched and washed as before, and is then reloaded with the next batch of stock.

With this type of operation, all operating functions are controlled individually by pushbuttons in a station near the vestibule door. Change-over from automatic to manual control is made simply by turning a master switch. By properly spacing the cycles of operation, several of these furnaces can usually be serviced by one operator for batch-type operation.

Built-In Gas Generator—As shown in Fig. 2 the gas generator is built into the furnace chamber, and thus requires no floor space. The generator produces a sufficient volume of diluent gas for furnace operation without requiring any heat from the furnace.

This gas generator consists of two identical units, one in each side of the furnace, each made up of a vertical radiant tube surrounded by a larger tube, with the space between filled with a catalyst. Any raw gas or light fuel oil can be burned in the radiant tube, and a metered flow of air and fuel provides the desired characteristics of the resultant gas after combustion. Spirally-fluted firebrick suspended down the center of each tube promotes combustion and increases the flow of heat through the tube walls. Combustion is complete when the gas leaves the tube.

This gas goes to a cooling tower to reduce its moisture content. Raw gas (methane or propane) is added to this dried gas, and the mixture then passed through the heated catalyst surrounding the radiant tube to produce a carrier gas of the required composition. This hot carrier gas is discharged directly into the furnace chamber. For carburizing, hydrocarbon gas is fed into the furnace through alloy pipes in opposite walls; and for carbonitriding, ammonia and hydrocarbon gas are added.

Carrier gas produced by this new process is much lower in hydrogen content than most present catalytic-generator gases. At the same time, it may be produced at lower temperatures than had been thought possible, while still maintaining a low residual methane content and with no tendency to plug up. Control of the generator is simple, requiring minimum attention.

The gas produced analyzes approximately 16 per cent CO and 20 per cent H_2, (*Please turn to Page* 137)

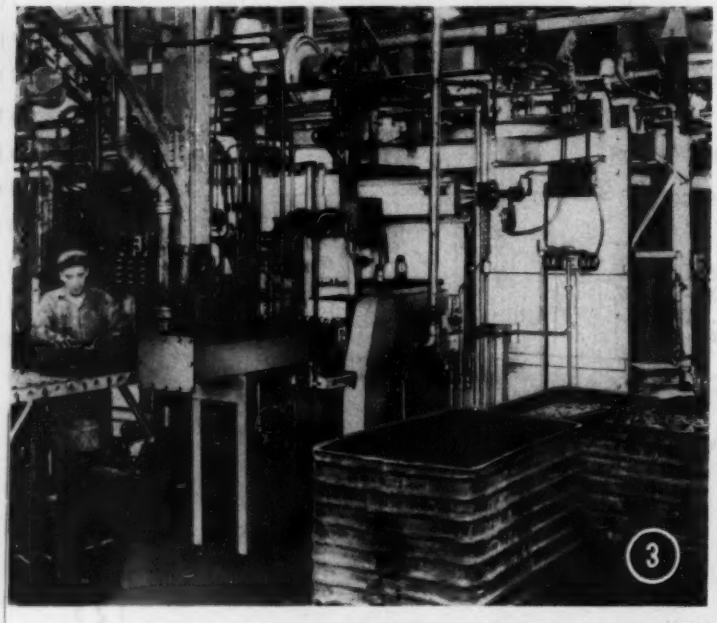

Fig. 3—Rotary furnace installed in automotive plant used for carbonitriding, clean hardening or deep case carburizing of small and medium-size parts. Continuous automatic or batch-type operation can be used, depending on the job requirements. Furnace at right and similar unit at left of operator both deliver quenched work to the wash (behind operator)

Fig. 1—Overhead crane lowering a 47-ton diesel-electric locomotive on flat car. Courtesy General Electric Co.

EFFICIENT HANDLING METHODS Can Cut Production Costs

By WALTER F. TOERGE
Associate Editor, STEEL

Part I of a series of articles describing how metalworking industries effect savings in time and money and improve working conditions by utilizing materials handling equipment

Progressive metalworking plants are becoming increasingly aware of advantages to be gained by proper application of materials handling equipment. Problem of selection, however, is extremely complex because of the variety of handling devices presently available and the diversity of production situations companies are called upon to meet. Careful preliminary planning, taking into account such factors as physical conditions of the building and cost considerations, and a thorough knowledge of recommended handling methods are among the aids at management's disposal

MODERNIZATION of materials handling methods in any metalworking plant can be expected to yield beneficial returns only in proportion to actual plant needs and care exercised in conducting a preliminary analysis of the problem. Whether or not it is possible to realize any savings depends also on final selection of materials handling equipment to fill the requirements. Mechanical, powered devices and apparatus of every conceivable type are available in the form of conveyors, overhead traveling cranes, mobile cranes, hoists and elevators, industrial tractors, platform, fork and hand trucks. With-

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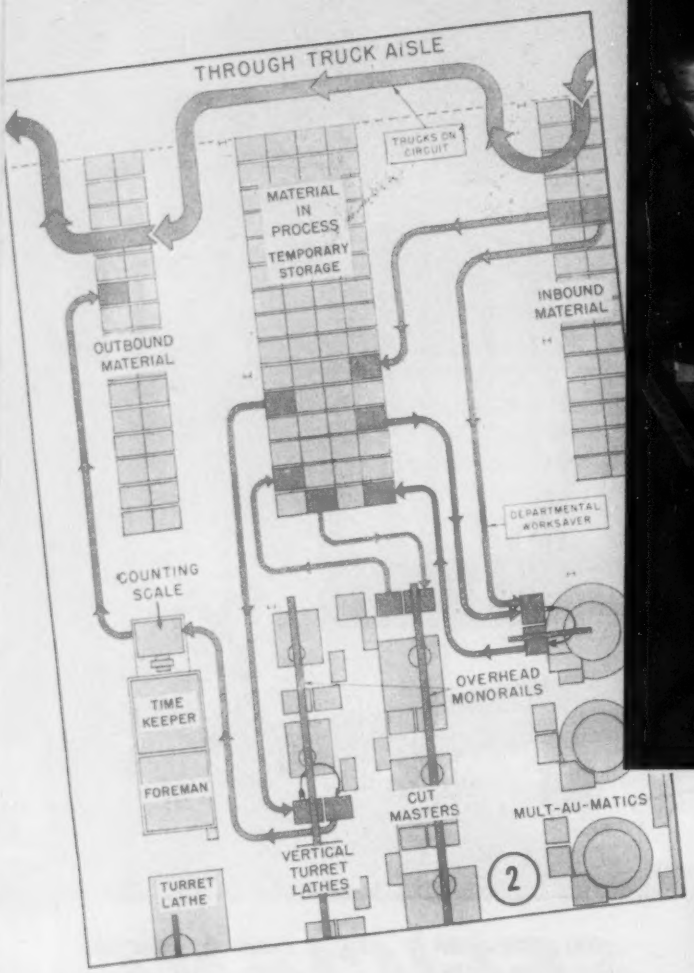
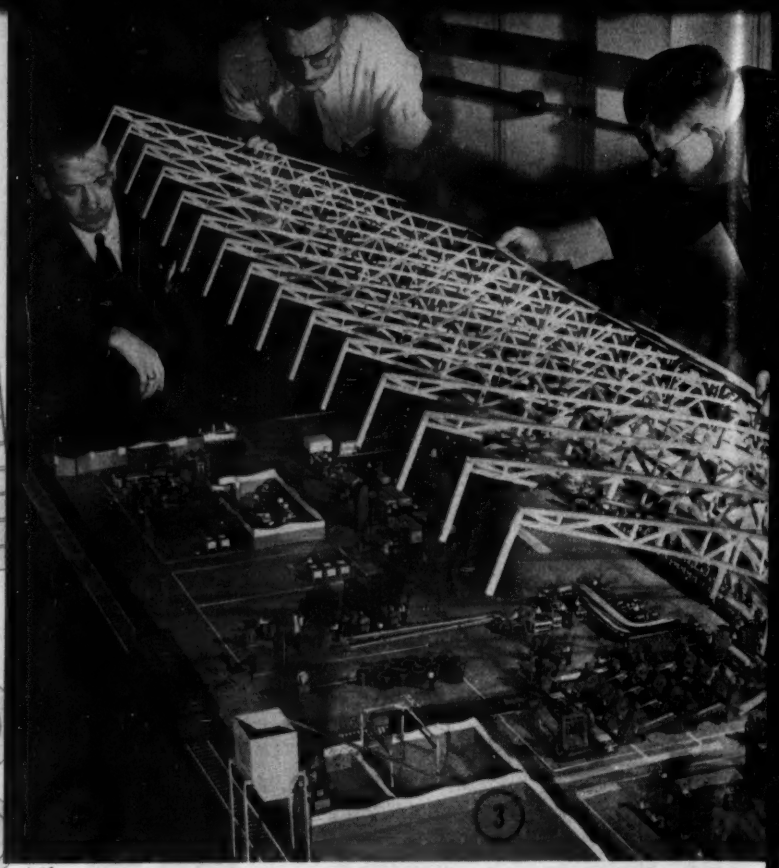




in each of these categories many variations and specially-developed auxiliary aids exist for facilitating production, conserving floor space and reducing handling costs.

Perhaps the answer lies in simply rearranging production equipment without the acquisition of new lift trucks, conveyors, etc. Maybe more of the handling burden should be shifted from one type of device to another. Still further, a simple solution may be in changing the condition in which raw material is received. Best results in clearing away the complications will come from a co-ordinated approach, combining technical, economic and human factors. While no answer pattern exists which can be superimposed on every materials handling question, the experiences of successful metalworking plants can serve as valuable guides.

Selection of the system must always be the result of carfully planned, thorough, logical analytical study. An effective analysis can turn up some interesting facts relating to a plant's actual productive capacity.

Mechanization of operations is a matter of fitting the method to do the job, sometimes using standard equipment and sometimes home-made devices. In any event, all conditions existing on a specific job must be considered and organized. To do this, materials handling engineers have devised several aids in the form of questionnaires or visual assistance such as flow charts, scale charts and three-dimensional models.

Detailed Surveys—Some idea of the detail involved in conducting a survey can be gained from the following series of critical factors drawn up by Robert C. Brady:[1]

1. Determine whether the operation is permanent or temporary. An elaborate system would be unnecessary in the case of short-duration operations.

2. Do the sequence of operations and general plant layout lend themselves to efficient materials handling setups? Some of the points to be considered in this connection are whether operations are straight-line or functional, whether material travels from one building to another, or whether the building is multi-storied or single floor type.

3. Characteristics of the building must be examined, including floor load capacity, smooth or rough floors, wood, cement or other type of floor construction; size of doorways, aisles or passageways; high or low ceilings; degree of incline on ramps; elevator size and capacity; strength of the building structure to use the system contemplated.

4. Nature of materials or parts to be handled is of prime importance: Light, medium or heavy, large or small, shape. Is material bagged, in drums, wood boxes or corrugated cartons; bulk, by the piece or as a unit? Can it be treated roughly, or is it fragile? Other considerations in regard to materials or parts include: Distance to be transported in the plant, quantities handled, intermittent or continuous flow, processing while in motion.

Points to be checked regarding the equipment proper:

1. Kind or kinds of equipment suitable for the job. Can a standard unit be used? Must it be power-driven?

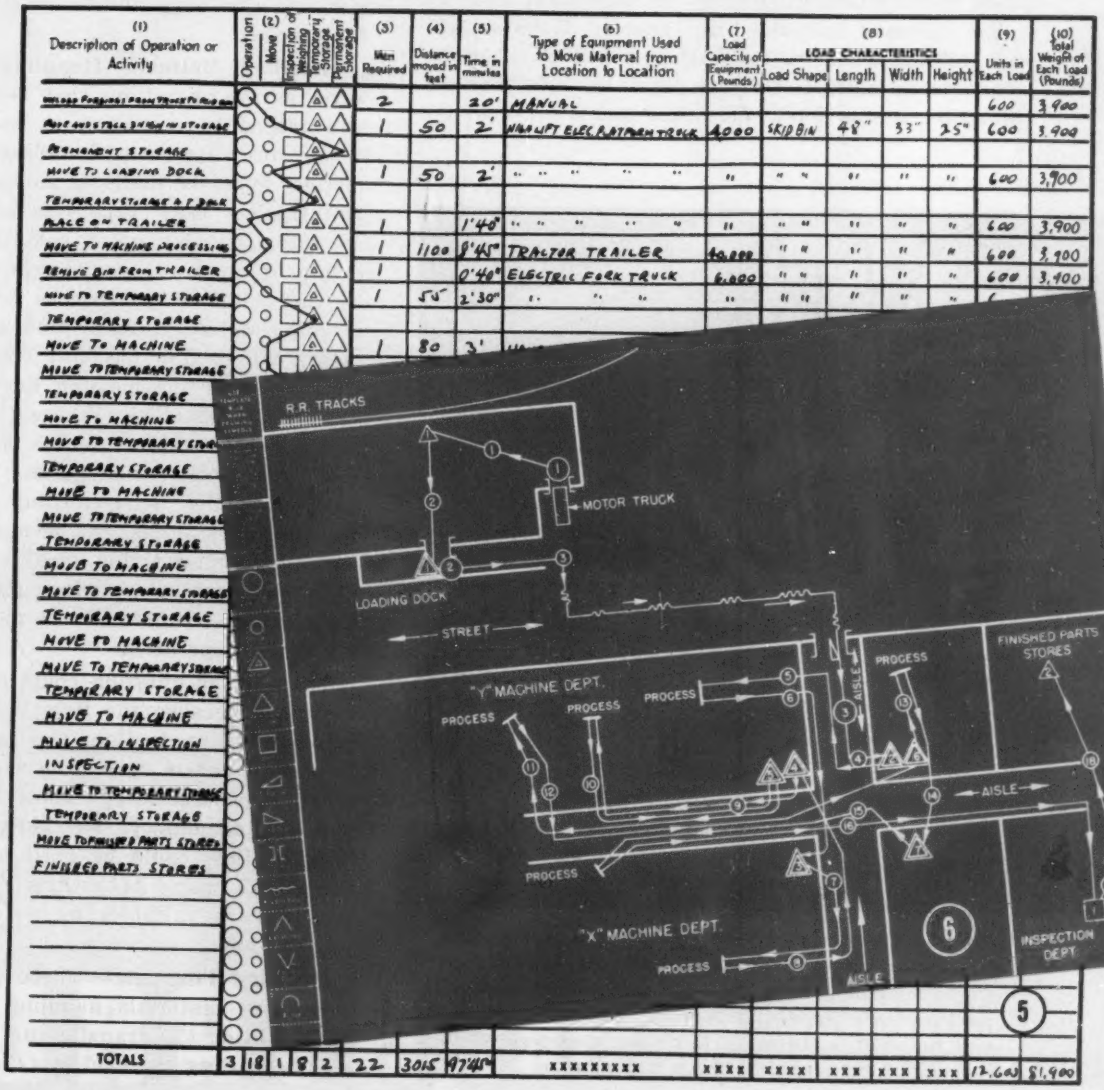
Fig. 2 — Another type of graphic representation, showing flow of material through one department of Yale & Towne's new Philadelphia plant

Fig. 3 — A typical three - dimensional layout of a modern intermittent manufacturing plant. Courtesy Westinghouse Electric Corp.

Fig. 4—Roller conveyors find wide application in steel mills transporting heavy, concentrated loads

Fig. 5—Understanding of complicated handling activities can be simplified by charting on a visual analysis sheet. Courtesy Yale & Towne Mfg. Co.

Fig. 6—From data compiled on the chart shown in Fig. 5, and from a plan of the plant layout, route of travel can be diagrammed as shown here



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2. Capacity of the equipment to do the job.

3. Hours it will be in service daily. Equipment must be rugged enough to take maximum amount of service required.

4. Size and design, with an eye to space requirements for operation in aisles, doorways, floor load capacity.

5. Is the equipment flexible as to types of loads? Would it be adaptable to other service in case the operation for which it is originally purchased were cancelled?

6. Power requirements.

7. Ease and speed of operation.

8. Relationship to other handling equipment already in use or planned for the future.

9. Can the systems be co-ordinated?

Preliminary Planning—A good example of how preliminary planning can save money is the case of one manufacturer who took the trouble to review his production setup before changing it. Materials handling considerations formed a sizeable part of the investigation, which indicated that a good solution to the plant problems could be had by building a one-story, 200,000-square foot manufacturing plant. The adjoining multistory structure was converted to warehouse space. The project totaled $2,200,000.

Early studies had already pointed to a need for a new manufacturing building. In these first reviews, it was assumed that the forge shop, a 35,000-square foot building would be replaced by a new structure to be located adjacent to the new plant. Upon further examination, it was determined that such a move would not be economically sound. Based on the production schedule, approximately 110,000 pounds of material per day would pass through the forge shop. Converted to power truck loads of 3000 pounds each, this would include 36 loads. These would have to be hauled from the present forge shop to the new manufacturing area, daily, a distance of 400 feet. Method of handling materials in "bunks" would be unchanged.

For these reasons, the only additional expense in operating the forge shop would be the added cost of travel time between the forge shop and the new manufacturing site. Since loading and unloading was a fixed requirement, this additional travel time was estimated without considering the other handling costs: 2 hours, using one power truck per day.

Approximately $250,000 would have been expended to construct a new forge shop. Moving the equipment would have cost another $150,000. Obviously, it would not have been practical to spend $400,000 for the sole advantage of placing the forge shop 400 feet closer to the main manufacturing building. Under the present arrangement, additional materials handling expense is approximately $5 per day or $1250 annually. This decision, based on logical analysis, called for no additional materials handling equipment, because the forge shop was already equipped with platforms and bunks for transfer with power lift trucks.[2]

Handling Methods—Handling methods are as diverse as the operations they serve. The plan evolved and placed in operation in one job shop foundry, beset with all sorts of handling problems, uses three distinct types of material movers: Conveyors, cranes and trucks. Each type was chosen for its specific advantages under given conditions. Trucks, for example are now in service where flexibility afforded by the unit load system can best be utilized—in the cleaning and snagging section and in the core department. Where flow has both fixed origin and destination—between the pouring lines and shakeout—conveyors are installed. Where flow is nearly uniform and requires a limited degree of flexibility, cranes are used with hooks or magnets. Cranes are in service handling ladles between four electric furnaces and the pouring stations, and in moving castings through annealing, sandblasting, final inspection and shipping. They also serve as supplementary equipment for lifting castings too heavy to be picked up manually during various operations.

The shop in question could not be completely conveyorized because the firm is not normally engaged in repetitive production. Castings poured range widely in size; orders vary from week to week. A variety of all sizes of castings made here are used in road building machinery, locomotives and ships. Fixed lines of flow could be used to link only certain of the shop's many operations; other operations, subject to many variables, needed a highly flexible handling system.

Primary Functions—Three primary functions are served by materials handling systems: (1) Picking up the load; (2) transferring it from place to place; (3) depositing the load at (*Please turn to Page* 107)

Fig. 7—Tiering packaged tin plate in temporary storage area of shipping department of a large steel company. Strapped to single-faced pallets, packages are handled from four to six at a time and tiered from 10 to 14 feet high. Courtesy Electric Industrial Truck Association

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FUNDAMENTALS OF STEELMAKING

NUMBER 7 OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

By PHILIP S. SAVAGE
Vice President
Donner-Hanna Coke Corp.
Buffalo

Production of Metallurgical Coke AND RESULTANT COAL CHEMICALS

The severe shortage of metallurgical coke, and poor quality of much that is available, have offered an incentive to build new ovens that resulted in the planning and actual construction of more new ovens during 1948 than have been built for many years

POSTWAR years of 1947-48 will go down in the history of steelmaking as the time during which the importance of cokemaking facilities was brought into sharp focus by steel plant and foundry management. During the great expansion of the coke industry, which occurred during and immediately following World War I, coke ovens of the chemical and gas recovery types were tremendously expanded. High price of the chemical products of coal, and relatively low labor and construction costs, made chemical type coke ovens a prime investment. Capital was poured into the coke oven industry. A very large percentage of the technically trained men going into the steel industry were sent to the coke oven department. These men, since World War I, have kept the industry functioning so well that for

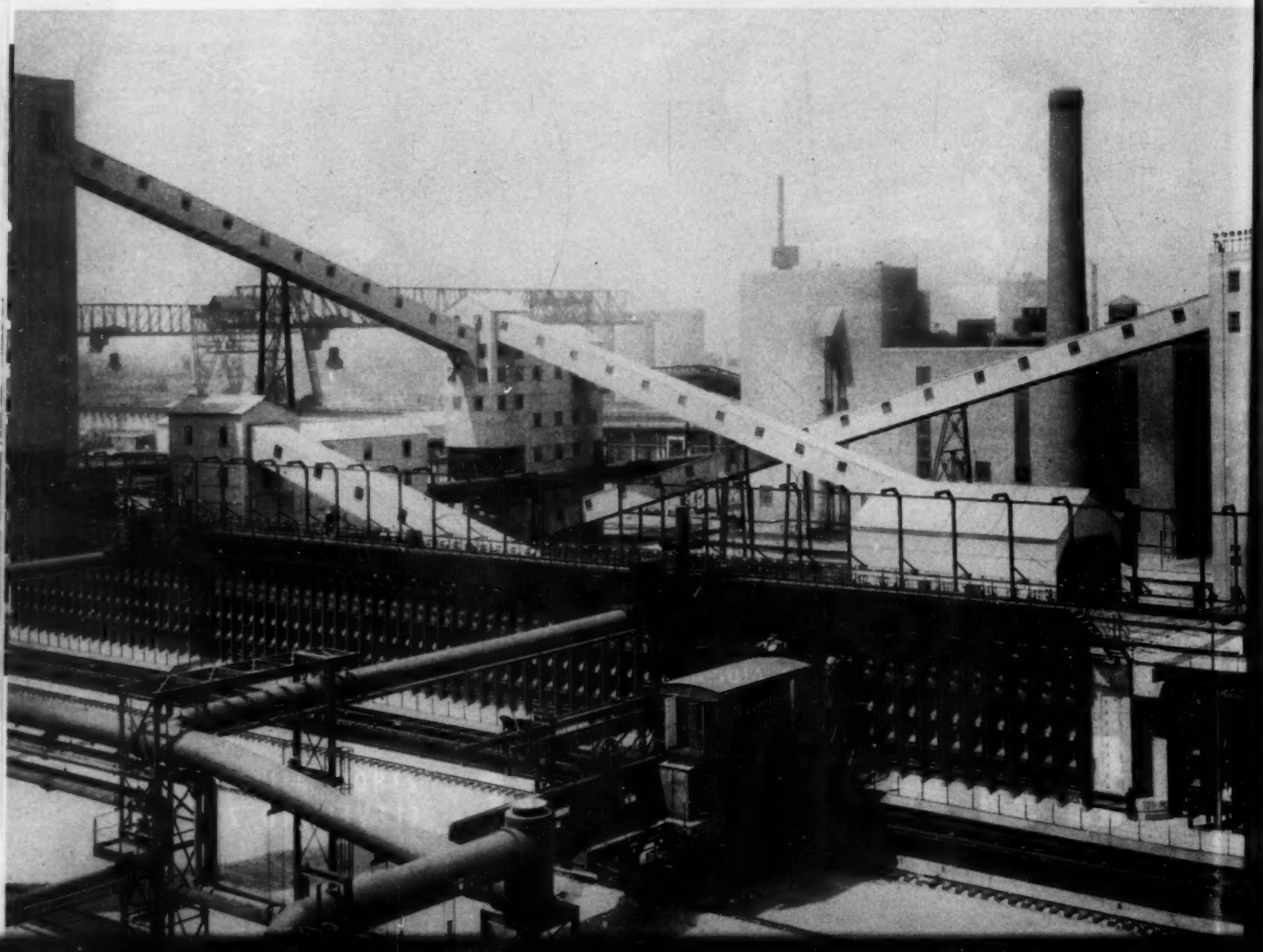

Fig. 1—Panorama of modern underjet coke ovens

Photos courtesy Ford Motor Company

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Production of Metallurgical Coke

25 years coke oven departments of most steel plants presented only a minor problem, while the continuous strip mill, electric furnace, and other more spectacular departments received most of the attention and money.

In World War II ample coke was still available by diverting coke that had flowed into domestic channels back to the metallurgical industries, and by re-activating idle beehive ovens. The Office of Price Administration saw to it that no inducements were offered to build chemical recovery ovens, by holding prices of coal chemicals at depression levels, while coal costs, labor costs and construction costs were allowed to soar. Toluol, the need for which gave a great impetus to coke oven construction in World War I, was produced from petroleum with government financing, and relatively few new coke ovens were built during the recent war period. Thus, the postwar boom in steel has found the coke oven industry with more than one-third of its ovens over 25 years of age, and most of its skilled operators and supervisors with the best years of their lives behind them.

Old beehive coke ovens, long since abandoned, have been pressed back into service even where no suitable coal is left nearby. Coal both suitable and unsuitable has been trucked many miles to these ovens, and inferior coke produced at very high prices, to meet the shortage at both steel plant and foundry. Foundries, in their desperation for suitable fuel, have used large quantities of anthracite coal, and even coke breeze briquettes have been used in at least one plant.

Greatly increased demand for gaseous fuel, the high price of fuel oil, and the greatly expanded demand for coal chemicals and ammonia, are gradually correcting the inequities in the pricing of coke oven products left as a heritage of the Office of Price Administration. The severe shortage of metallurgical coke, and poor quality of much that is available, have offered an incentive to build new ovens that has resulted in the planning and actual construction of more new ovens in 1948 than have been built for many years. This boom in coke oven construction is taking place despite the fact that cost of coke oven construction in 1948 was approximately two and one-half times higher than the cost of similar construction in 1939.

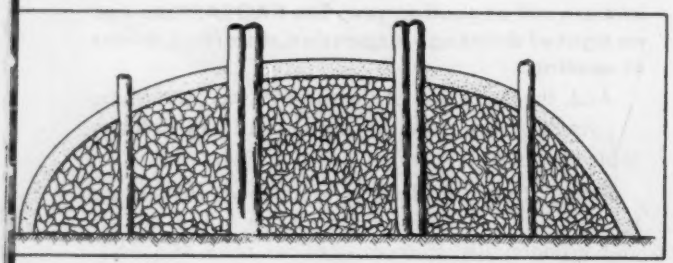

Fig. 2—Early method of cokemaking in a pile

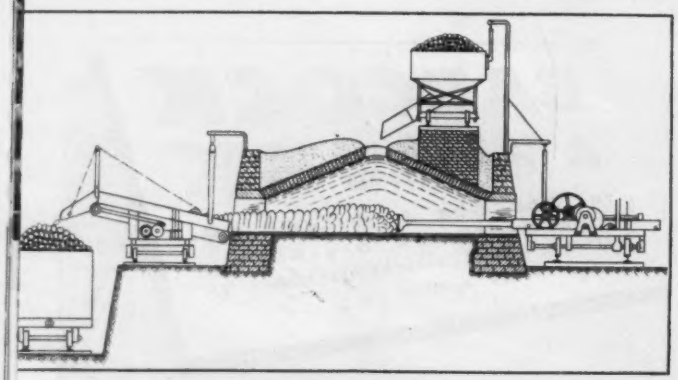

Fig. 3—Mechanical beehive oven

A recently completed job evaluation made in the steel industry has brought up coke oven workers earnings equal to workers of similar skills in other parts of the industry. Young technical graduates are being brought into the industry for specialized training. Designation of the name "by-products" to coal chemicals, and "by-product" coke, to the products of a chemical type coke oven has almost been completely dropped, and the "by-product" complex that has held back the coke oven industry is gradually being eliminated. Opportunities in the coke oven industry today are unusually good, and the writer believes that within the lifetime of the average 1948 college graduate the carbonization of coal and its synthetic products will be carried on by an industry that will rival the great steel and petroleum industries of today. Coal must be the future source of most of our liquid and gaseous fuels. Coke oven trained men will be ideally fitted for this industry.

Production of metallurgical coke goes back to an-

The author, Philip S. Savage, graduated with a Bachelor of Science degree in engineering from the University of Missouri in 1915 and started work at the Illinois Steel Co. coke plant, Gary, Ind., as a still helper, working up to assistant foreman in 1916. The same year he went to the Toledo Furnace Co. as coke plant foreman and was successively by-product foreman, heater, battery foreman and spell general foreman until June of 1917. He then joined Colorado Fuel & Iron Corp. as general foreman of the benzol department and later general plant foreman, until September of 1919 at which time he joined Donner-Hanna Coke Corp. as assistant superintendent. In 1925 he left Donner-Hanna to take a position as superintendent of the By-Product Coke Corp. in Chicago, but returned to Donner-Hanna late the same year as superintendent. He was appointed general manager of Donner-Hanna in 1930 and vice president in 1932. Also since 1937 he has served as president of Economy Fuel & Supply Corp., a coke and slag sales subsidiary of Donner-Hanna.

He is a member and director of the American Coke & Coal Chemicals Institute, a member and past director of the Eastern State Blast Furnace & Coke Association and member of the Chicago District Blast Furnace & Coke Association, American Iron & Steel Institute and Association of Iron & Steel Engineers.

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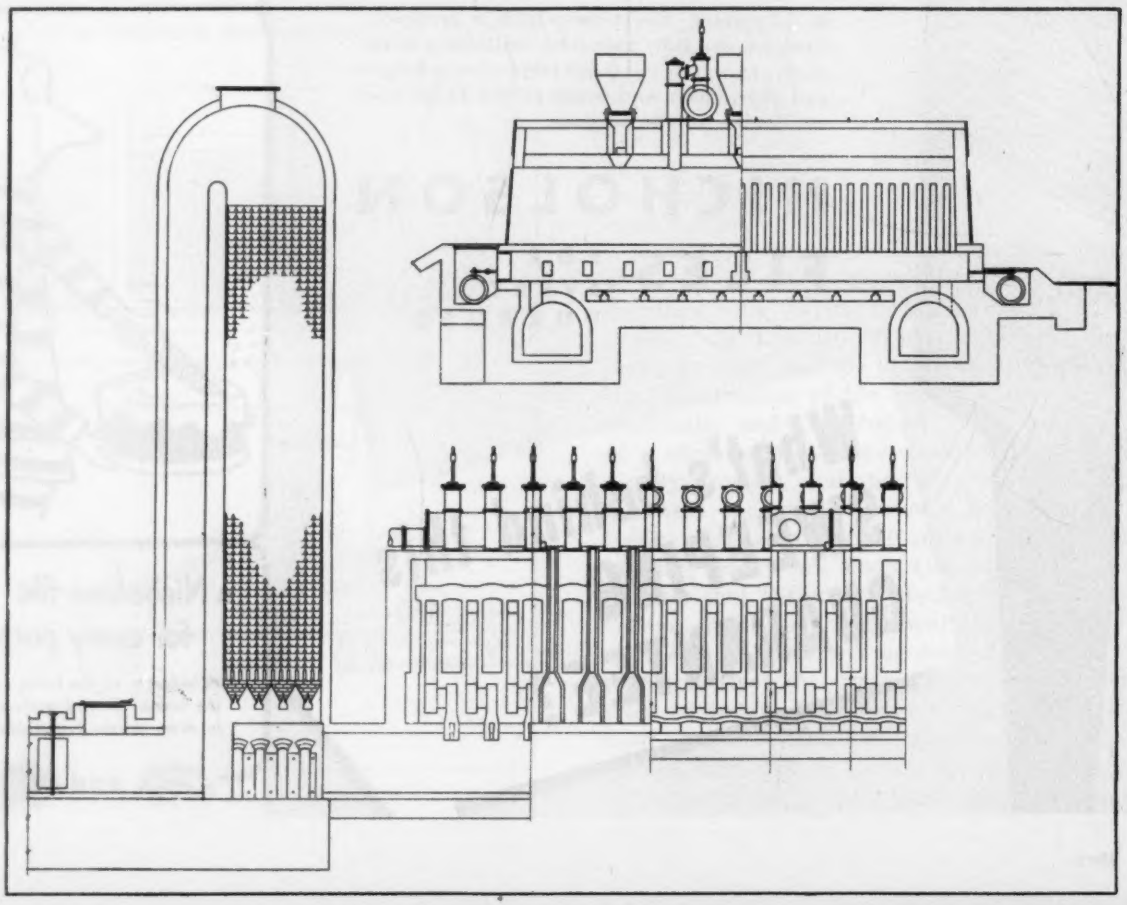
tiquity. It was known to the ancients that certain types of coal would become plastic when heated, and then set up into a porous solid. This fact was put to practical use in ancient India and China where a crude coke was made simply by piling up lumps of coal and setting the pile on fire. After it was burning briskly, sod or wet straw was thrown over the pile to cut off the air. The heat of the mass caused the coal to become plastic and set up as coke when the gas was driven off. This crudely made coke was used to forge iron and steel. Although coke is referred to in more ancient literature, the first known recording on the art of cokemaking was written by Sir John Winter of England in 1640. He states that a product could be made by heating coal in an earthen vessel. To quote Sir John, he "burned the malignity out of the coal and produced a product that made a clear, pleasant chamber fire". From the experiment of Winter, and of the others who followed him, the beehive type oven was developed.

Beehive coke ovens are usually built of fire brick and, as the name would indicate, are hemispherical in shape. They are approximately 12 feet in diameter, 8 feet high, built in long rows with sometimes more than 100 ovens in a row. A front door is available for admitting air and pulling out the finished coke, and retaining walls are built up at front and rear to hold clay or loam with which the space between the ovens is filled. A charging hole at each oven top admits the charge and discharges the smoke and gas. A charging car runs on top of the ovens, usually from a nearby mine tipple. Yellow gaseous smoke from the charging holes of freshly charged ovens, and the red glow from the charging holes of ovens in which the coking is nearly complete, gave an eerie look in boom times to the valleys of the coke region. While beehive ovens today are obsolete and probably no more will be built in this country, the extremely high capital cost of modern chemical ovens and the relatively low prices of coal chemicals and gas, have often made beehive ovens economical to meet the peak coke load in boom times, despite the fact that they are extremely wasteful of our natural resources.

Beehive ovens can be quickly started up and shut down, and this has been another feature in their favor for meeting peak load conditions. Cold beehive ovens are started by building a fire of wood or coal on the floor of the oven chamber. When the oven brickwork is brought up to about 1200° F the ashes are raked out a side door and the door bricked up, leaving only enough door opening to allow air to enter for combustion. Coal charges are dropped from the top, and levelled either from the top or side. As the hot brickwork transmits heat to the coal, gas is evolved and ignites above the charge. Combustion is regulated by enlarging or decreasing the door opening to hold the temperature at about 2000° F for normal 48-hour coke. Gas evolution increases rapidly as the charge becomes heated, and then slowly tapers off until only very lean gas comes out the charging hole. Combustion air is gradually blocked off as coking is completed.

The 2-foot charge of coal on the floor of the beehive oven cokes from the top down, producing "fingers" that appear to grow from the floor up. Actually the coal is melted from the top surface

Fig. 4—United-Otto-Cowper regenerator ovens



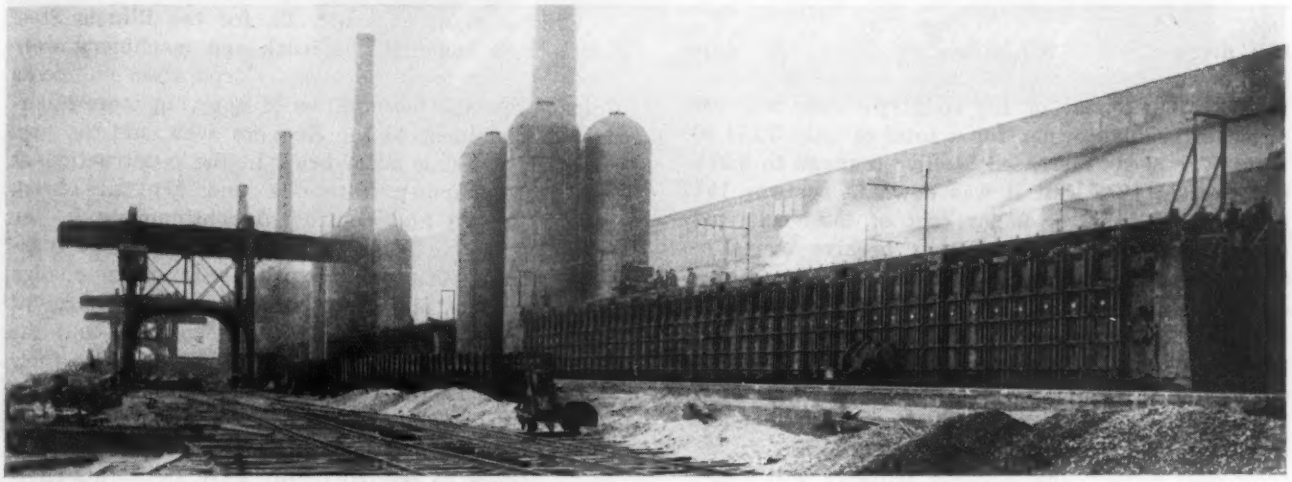


Fig. 5—Installation of Otto-Hoffman ovens. Note regenerators located at ends of ovens in steel shells

downward by the heat of the burning gas above the charge, and the plastic zone moves slowly to the floor leaving finished coke behind. When the plastic zone reaches the floor and sets up, coking is completed.

Coke is quenched in the oven, usually by circular sprays, like a lawn sprinkler, inserted in the top. Enough heat must be retained by the oven brickwork after quenching to ignite the next charge.

Furnace coke was usually made on a 48-hour cycle. As no work was ordinarily done on Sunday, a deeper charge was put in the ovens on Friday, and this was pulled on Monday after 72 hours of coking. The resultant coke pieces were larger and harder, and this was the original 72 hour foundry coke that some foundrymen still demand.

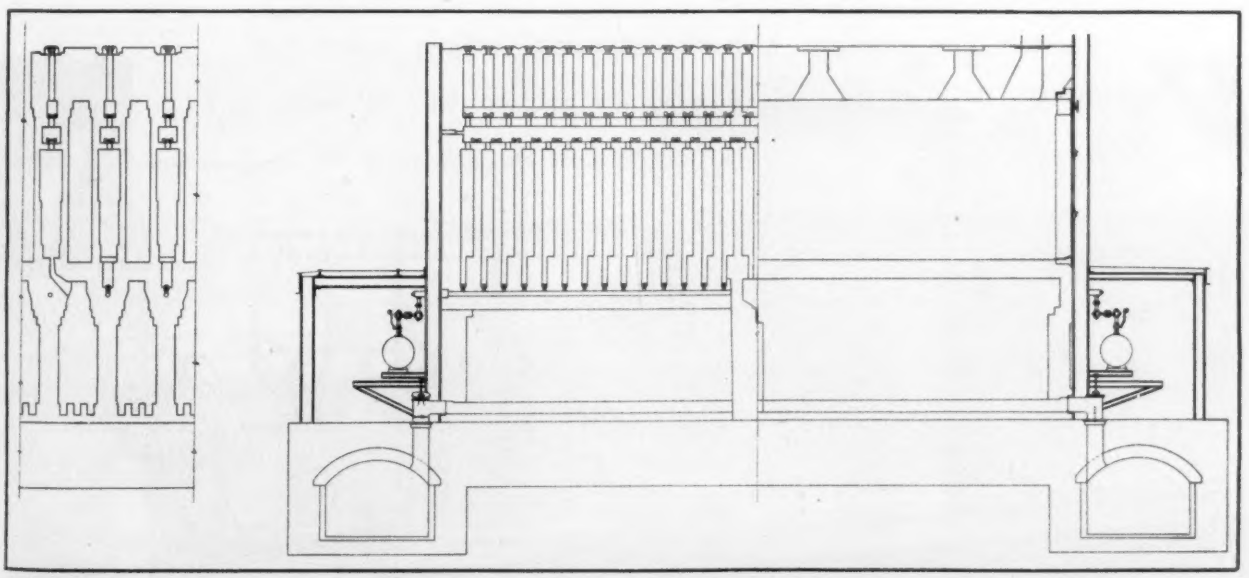
After quenching, the coke was raked out through the oven door and forked into cars placed on a depressed track alongside the ovens. The only screening was the falling of ash and coke breeze through the tines of the coke fork as a man forked the coke into a car. Coke drawing machines and coke loaders that put the coke over a fixed screen were also used, but hand drawn ovens still exist today.

A rectangular oven using the beehive principle was developed in Belgium and brought to this country in the latter years of the beehive period. These ovens were discharged by pushing, after quenching inside the oven. The Belgian ovens usually recovered part of the waste gas which was burned under nearby boilers. No coal chemicals were recovered.

The silvery appearance of beehive coke, as against the duller gray of chemical type coke, was thought in the early days to be beneficial. Actually, it is simply caused by graphitic carbon deposited on the coke's surface by a breakdown of hydrocarbons in the gas as it escapes from the charge. When coke is quenched in the oven below its combustion point, this graphitic surface remains on the coke and gives it a silvery luster. In modern ovens where coke is pushed from the oven hot and quenched outside of the oven, this graphitic luster is burned off. This in no way harms the coke but simply gives it a dull appearance.

Beehive coking started in America about 1850 and reached its peak in 1906 when 532 plants with a total of 93,901 ovens were operating. By 1922 these

Fig. 6—Koppers cross-regenerative ovens



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had dropped to 63,957 operating ovens and represented only 23 per cent of the total coke production. In 1937 6 per cent of the country's coke was produced in beehive ovens, for a total of only 3,164,000 tons. War needs increased beehive tonnage to 8,274,000 tons in 1942, but it was down in postwar 1947 to 6,687,000 tons, or 9 per cent of total coke production. As coal near existing beehive ovens becomes exhausted, we can expect beehive coke production to still further decline and eventually die out entirely. Despite the ability of beehives to take peak loads due to low capital costs, easy shutting down and starting up, the writer does not believe that new beehive ovens will ever again be built, and therefore when the present ovens lose entirely their coal supply, this colorful industry will die.

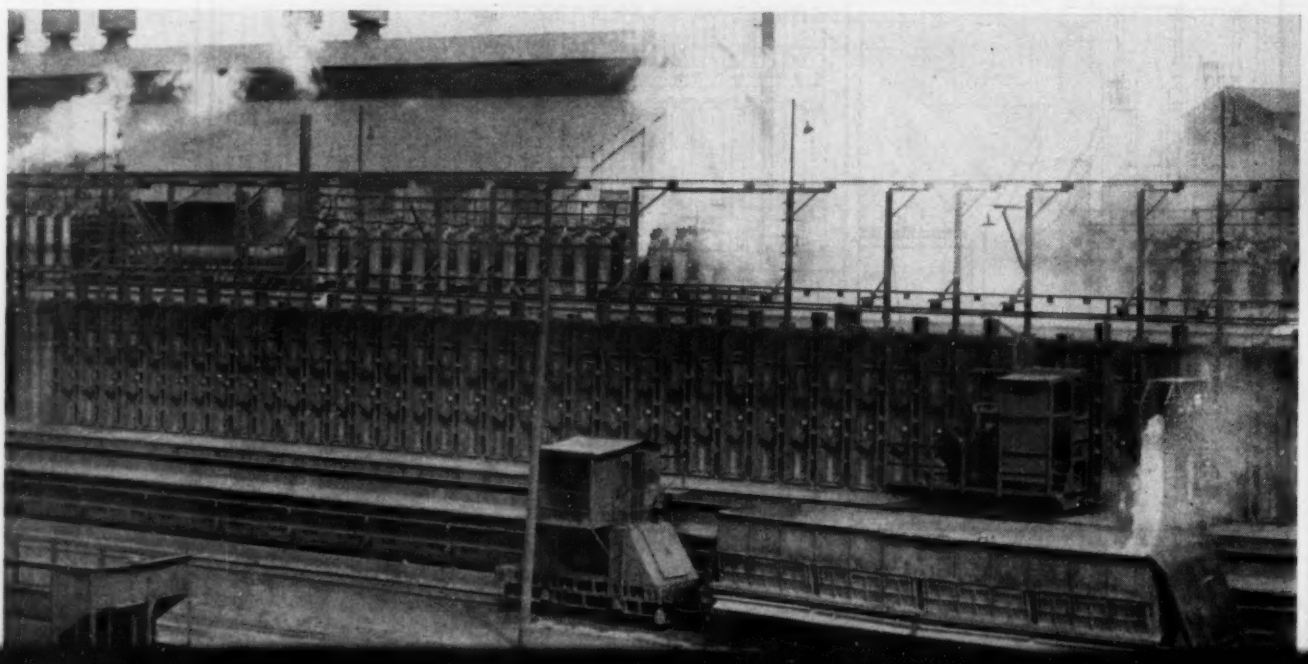
In 1798 William Murdock, a Scotch engineer, made the first gas from coal. He was so successful that only 14 years later the streets of London were lighted by gas lights with gas made in Murdock's retorts. Carbonization of coal at this point took two courses; first, where gas was the major product and coke secondary; and second, where coke was the major product and gas and coal chemicals the minor ones. English engineers developed the first type, and coal gas plants sprang up all over England, but for metallurgical coke the English continued for many years to use beehive ovens. The second—chemical type ovens—which could also make high grade coke, were pioneered on the continent in Germany and Belgium. Today, this second type of oven has not only replaced the beehive oven, but has also practically eliminated the gas retort, as modern ovens are both the most efficient producers of coal gas as well as the most efficient producers of high grade coke for practically any use.

In 1893 the Semet-Solvay Co. of Belgium built the first chemical coke plant in America at Syracuse, N. Y. Others quickly followed. In 1905 the Lackawanna Steel Co. built six batteries of Otto-Hoffman and Rothberg ovens. In 1905 the U. S. Steel Corp. chose the Koppers ovens as the most suitable oven available for their use. Dr. Heinrich Koppers and a staff of engineers were brought to the United States to build a plant at Joliet, Ill. for the Illinois Steel Corp. Even some of the brick and machinery were brought over from Germany. Corporation engineers quickly saw the possibilities of applying more labor-saving machinery to the Koppers oven, and the possibilities of using silica brick in the construction of the oven chamber. Firebrick and quartzite brick both expanded and contracted continuously in the range up to the fusion point. An oven built of these brick will contract and expand with every change of coking time, and even with every fresh charge of coal. They are very difficult to keep tight and the continual expansion and contraction shortens their life. Pure silica brick on the other hand expands rapidly up to 1200° F, but from there to the fusion point expansion and contraction is very slight. It seems almost as though nature gave silica this characteristic so large modern coke ovens could be successfully built. Adaption of silica brick to coke oven construction was America's greatest contribution to the industry. It put this country far ahead of the rest of the world in coke oven design by the end of World War I. A life of only 5 to 10 years was obtained from fireclay ovens, while silica brick ovens of larger dimensions now can be expected to last upwards of 25 years, and some well maintained ovens now operating will undoubtedly have a life of more than 40 years.

The first real American coke oven plant was the great Gary coke plant of the Illinois Steel Corp., now Carnegie-Illinois Steel Corp. Not alone was this plant built of silica brick, but it incorporated most of the labor-saving devices still being used today. Coke oven engineers never developed so many real improvements so fast as they did between the building of the Joliet plant in 1905 and the completion of the Gary plant in 1908.

World War I gave a tremendous impetus to the building of modern coke plants in America. Five to seven dollars per gallon toluol, 1 dollar per gallon benzol, and 150 dollars per ton sulphate of ammonia,

Fig. 7—Installation of Koppers cross-regenerative ovens



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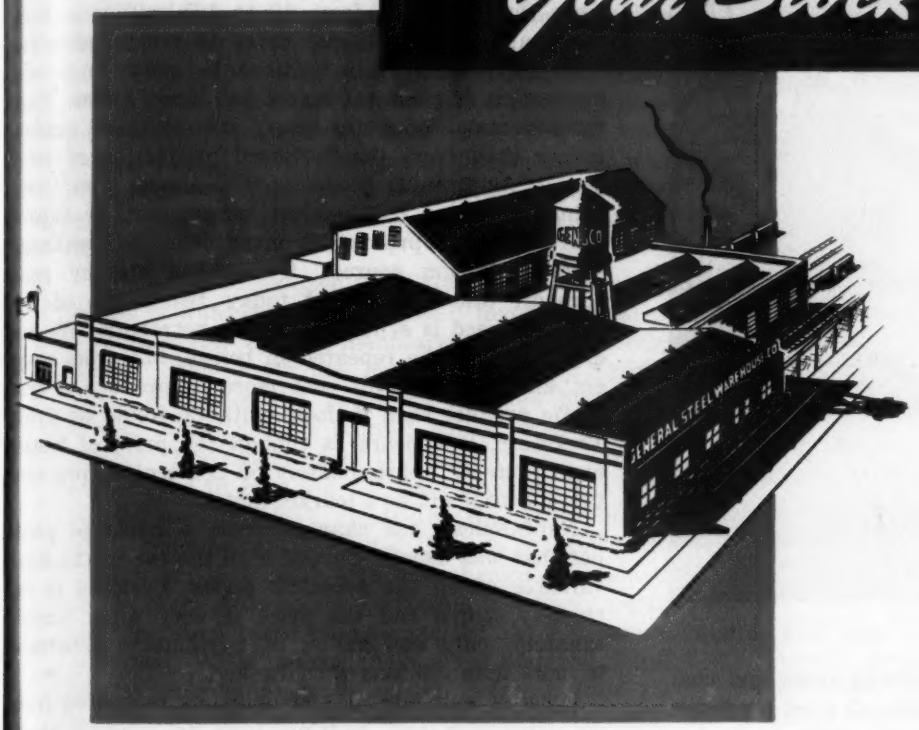

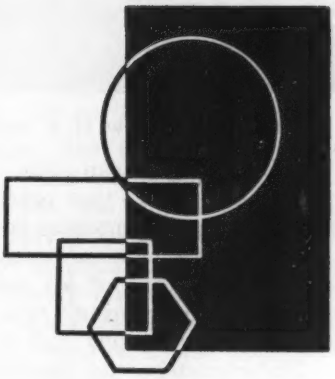

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Production of Metallurgical Coke

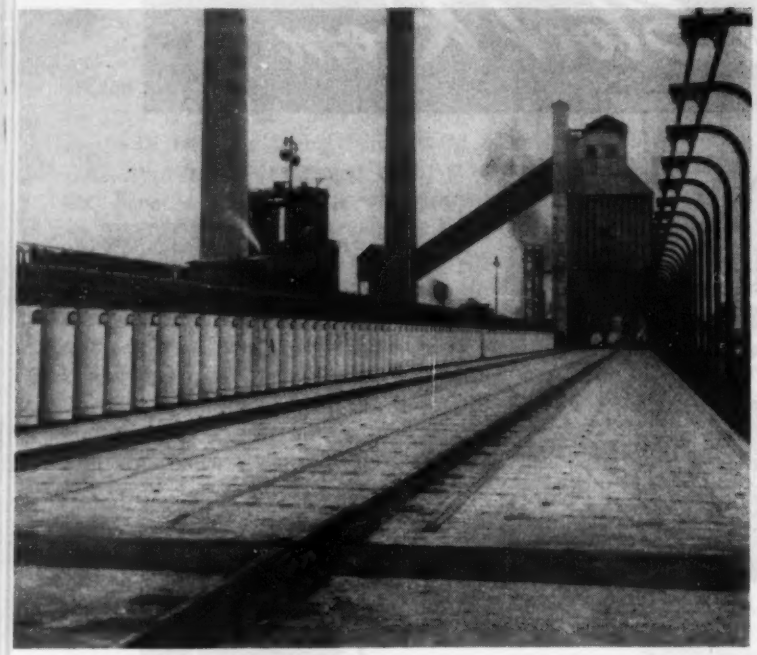

Fig. 8—Top view of a modern coke oven battery

with relatively cheap labor, building costs and coal, made an incentive that practically all steel producers and many gas companies could not resist, and when the war was over so many plants had been built that 60 per cent of all coke produced in America was made in recovery type ovens. Before the war boom was over, this had increased to 90 per cent.

Unfortunately, no incentive was offered during World War II to build coke ovens. While the price of coal and labor was allowed to soar, price of coal chemicals was held by the Office of Price Administration at depression levels. The result was inevitable, and there was little coke oven expansion during the war except where new blast furnace capacity was built and old ovens were actually replaced. Instead, old beehive ovens were rehabilitated, and today the country is desperately short of coke and many coal chemicals.

We are living in a chemical age, and coal chemicals are among the most important raw materials. Production of chemical grade benzol has increased more than 4 times, from 40 to 165 million gallons per year since 1939, and there is every indication that the demand will continue to grow. Increased production of chemical benzol has largely come from the conversion of motor benzol into chemical grades rather than from the increased production of total benzol. As suitable benzol is now almost completely being converted to chemical benzol, further expansion in benzol production must come by synthesis from petroleum sources. Toluol has already gone through this phase, and today two-thirds of the quantity used is synthesized from petroleum. We can expect this to be repeated in benzol, but from present knowledge it will cost more to produce a synthetic product than it does synthetic toluol or xylol. Therefore, it appears as though the price of benzol must increase approximately 50 per cent before synthetic benzol will be a market factor.

Naphthalene has changed from a nuisance product that was usually burned with the tar to the most valuable of all the aromatic series. Pyridine is extremely scarce and the price is very high. Unfortunately, only one gallon of pyridine is recovered to more than 100 tons of coal coked.

Price of sulphate of ammonia has recovered from its depression and wartime lows to a price about equal to what it was in 1925, and has again become a profitable chemical product to produce. The fertilizer manufacturer is tending to make more high-nitrogen mixed goods, and sulphate of ammonia is the only ammonia product available that will make satisfactory mixed fertilizer with a high nitrogen content. As long as demand for fertilizer continues, sulphate of ammonia should command a premium over other forms of nitrogen. There is every reason to believe that gas and coal chemicals in the future will carry more nearly their fair share of the cost of coal. This in turn will encourage the building of more chemical recovery ovens and eventually correct the present shortage in metallurgical coke.

(To be continued)

Line of Oil-Hydraulic Presses Standardized

Use of machinery made from widely interchangeable, standard components and offering "custom-tailored" efficiency at the low cost of standard equipment is one means of increasing productivity and reducing operating costs to offset high costs of labor and materials. Such standardization is now being carried out in the Multipress line of oil-hydraulic equipment, made by Denison Engineering Co., Columbus, O. Built for operations requiring pressing capacities from 1 to 35 tons, line is said to provide a flexible range of complete, self-contained presses to match any of a wide variety of industrial requirements. The presses are available in seven standard sizes, each designed for a specific dimensional and tonnage requirement.

Three groups of elements, interchangeable to a degree, make up the major operating components within the Multipress frames and offer a choice of combinations for varying ram speed and control. These units include: Hydraulic power assemblies, cylinder and ram assemblies of several sizes and control valves of as many as 10 different types. With the broad selection of frames and operating elements available, the company states that it is possible to obtain the exact tonnages needed for individual applications, regulative ram stroke length for maximum efficiency, the actual speed of ram action to turn out the highest number of pieces per minute at lowest production cost and the daylight opening, plus throat depths, in the frame to provide work area sufficient to accept parts or assemblies being processed.

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New and revised aeronautical material specifications, issued as of Feb. 1, 1949, are available from Society of Automotive Engineers Inc. Specifications being issued include those for carburetor flushing oil, corrosion preventive compounds, aromatic fuel resistant synthetic rubber, vapor resistant barrier material, aluminum alloy tubing and castings, brass sheet strip rods and bars. They may be obtained in loose leaf form from the society at 29 W. 39th St., New York 18, N. Y.

Efficient Handling Methods — *Continued from Page 92*

its ultimate destination, which may be either at a machine, or in a storage or shipping area. Mechanical equipment for performing these tasks is also divided into three principal groups: (1) Conveyors, (2) cranes and hoists, (3) industrial trucks. Their respective fields of application are: Movement of materials continuously over fixed lines of travel between fixed points; movement intermittently within a fixed area; movement intermittently throughout areas which have suitable running surfaces and clearances.[3]

The above breakdown is an almost absurd simplification of what can be an extremely involved situation. For instance, in the manufacture of automobiles, about 13,000 parts are handled for every finished unit. Materials and parts are received by rail or truck, dispatched to storage areas, ready for assembly. Practically every type of materials handling aid is used to turn out the final product. The automobile industry best illustrates the principle that great benefits can be gained through increased production per man hour with less physical exertion by the worker. Automobile production is a finely organized operation based on a balanced flow of parts and materials. While the complications of materials handling in making automobiles are different from the moving of fewer parts in other portions of the metalworking industry, the basic handling principles are the same.

One recently completed automobile plant is a good example of a closely-integrated system of materials handling and production control.[4] The one-story manufacturing building, 520 x 1480 feet, covers a total floor area of 882,900 square feet, with an assembly floor area of 835,000 square feet. Production capacity of the 1220-foot final assembly line is 550 cars daily. Continous flow of materials is of paramount importance here to guarantee delivery of the right part at the right time to each processing and assembly operation, and of the complete subassembly exactly when needed to the final assembly line. Movement of subassemblies toward the final assembly line is controlled by a telautograph system.

Motorized equipment is used to transport parts from railroad freight cars to various storage areas located adjacent to the receiving stations from which they are conveyed to subassemblies and to final assembly. Frame storage conveyors located parallel to the car tracks receive heavy units such as frames directly from the freight cars. The conveyors travel from the platform to the main assembly area. Motors are unloaded onto a special conveyor and suspended on end on the overhead motor storage conveyors.

Continuous Flow Layout—Plant layout was designed for continuous flow of component parts to subassembly stations situated for the most efficient flow of the final assembly line. Subassembly locations follow the requirements of final assembly, feeding into it in the following order: Frame assembly, motor storage and decking, front end assembly including radiator, grille and front fenders, body assembly, build-up, painting, trim and body storage. Hood section, wheel and tire area and cushion department are situated beside this portion of the plant.

General production plan of one farm equipment manufacturer is to build major subassemblies along the main assembly line and feed them by means of an overhead chain conveyor into the line.[5] Mechanics of flow of materials through the 100,000-square foot department is extremely involved. Materials handling equipment consists of rails, hoists, chutes, roller and chain conveyors, castered dollies, bolt pans, skid racks, lift and fork trucks. Not a single hand-filled stock rack can be found in the entire department. All material is transported on skids, pallets or in tiering racks.

While such complex and delicately balanced circumstances are not encountered in most metalworking operations, nevertheless any progressive plant, new or old, should be designed to facilitate streamlined flow of material, from receiving through ware-

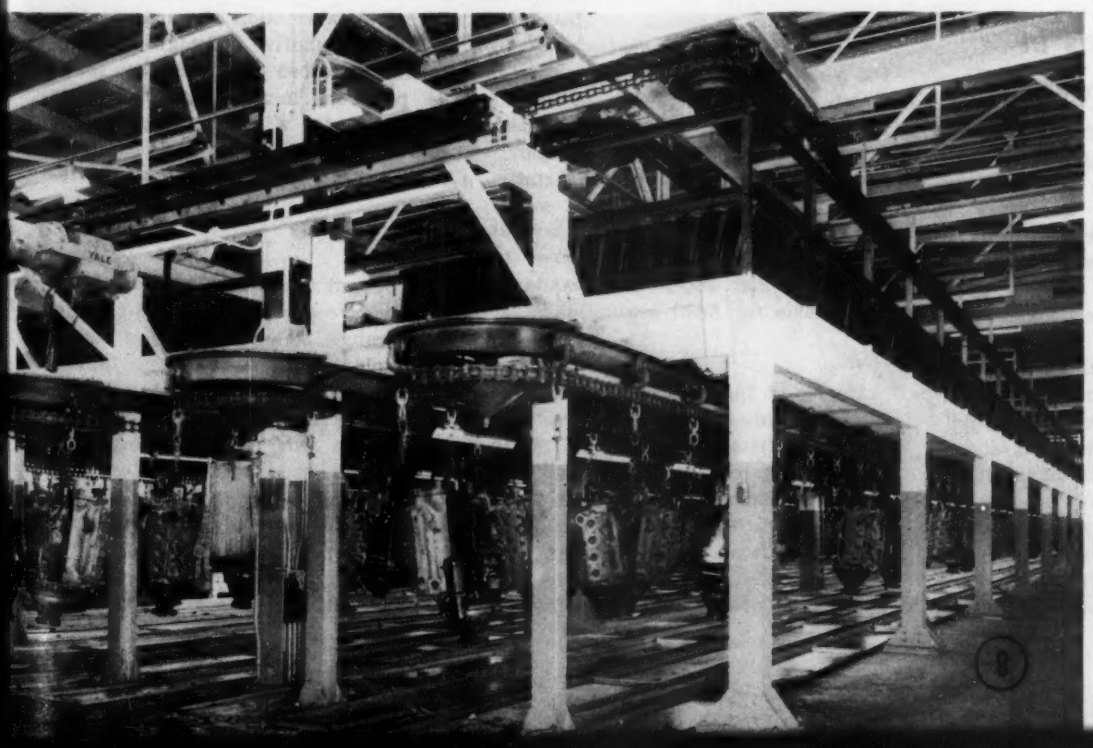

Fig. 8—At the receiving platform of one automobile plant, motors are suspended on overhead conveyors for storage and delivery to the motor dress-up line. Courtesy Mechanized Handling Systems Inc.

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housing, processing, warehousing again and final shipping. Handling coupled with production is almost continuous. It is present in each step from machine to machine within a plant and from department to department. Since no freight bills are passed for this material, management often has no idea what it costs to transport materials around a plant and so it remains a hidden charge against total manufacturing costs.[6]

Measuring Costs—Some means of measuring costs of materials handling is very hard to establish. In most plants there is no definite division between manufacturing and handling costs. Cost control and cost analysis constitute baffling problems in many companies. Everybody recognizes the importance of accurate and complete handling cost information, but methods of segregating handling costs from manufacturing expenses are complicated.

Close scrutiny of handling methods will reveal that this phase of manufacturing represents a much larger portion of the cost pie than is suspected. Estimates range from 20 to 80 per cent of all indirect labor. Reason for the wide range is self-evident. Each plant has its own problems.

In foundries, for example, 150 to 300 tons of materials must be handled for every ton of finished castings. While it is true that the same ton is moved many times, the weight is not reduced in the slightest and time and energy still have to be expended. Few other industries are burdened by such a handling job. As a general rule, materials handling occupies a good 40 per cent of all shop activities.

Better tools, simplified processes, automatic machinery, incentive plans and efficient assembly setups are all designed to reduce labor costs. But the fact remains that 40 per cent or more of all plant operations is concerned with materials handling—moving work to and from machines, transporting raw materials, parts and finished goods. Consequently the items which were formerly buried under "overhead" are undergoing much closer examination.[7]

Stores expenses as well as handling or trucking costs are are separated by many cost-checking systems; such information is useful in recognizing such conditions as excessive manual handling, obsolete equipment or the necessity for rearranging jobs still performed manually. Some systems put expense arising from lost time or from spoiled work into special accounts. This information, too, is useful in materials handling management because much lost time and spoiled work is due directly to handling methods used.[3]

Integration of materials handling facilities with manufacturing procedures depends upon known volume and capacity. To understand fully the ramifications of costs, there appears to be dire need for a common unit-of-handling, against which the extent of materials handling costs can be measured.

In addition to costs, from management's standpoint, another factor of prime importance is that of machanizing for the sake of safety. The National Safety Council points out that out of 634 disabling materials handling accidents, 147 resulted from lifting with a bent back. Insecure footing, improper placing of hands and lack of protective equipment caused some of the other injuries. A logical conclusion is that "unnecessary handling of materials means unnecessary exposure to accidents."

(To be continued)

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Use of Standards in State Laws Analyzed

Every industry or group that has found its business hampered by varying local requirements and by regulations that make it necessary to supply out-of-date or nonstandard materials will be interested in studying the suggestions offered by a group of experts in the booklet, "Nationally Recognized Standards in State Laws and Local Ordinances", published by American Standards Association, New York. The committee has come to no decision and is making no recommendations, but the association hopes that the booklet will bring comments and suggestions that may help to solve the problem.

Four principal papers included in the booklet show how the lack of uniformity in technical requirements increases costs to industry and to the public and reduces public safety. They analyze the need for legal methods that will permit widespread use of nationally recognized standards; summarize the present status of the "adoption by reference" method; and discuss the legality of several methods that have been followed in using national codes and standards as a basis for local regulations.

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Copies of the booklet, "Application of Arc Welding To Locomotives", by F. H. Harrison of Adelaide, South Australia, are available from the James F. Lincoln Arc Welding Foundation, Cleveland 1, O. Reprinted from the foundation's book, "Design For Welding" the booklet concerns the application of arc welding to the design and fabrication of an Australian steam locomotive. Design requirements indicated the necessity for a 44 per cent increase in grate area over that for a standard locomotive and a welded design was used to keep within existing weight limitations.

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Proposed revision of simplified practice recommendation R8-47, ferrous range boilers, expansion tanks, and solar tanks, would add 18 and 24-gallon painted, horizontal expansion tanks to the list for stock production, in order to accommodate intermediate size heating systems requiring tanks in these sizes. The National Bureau of Standards announces that it is being distributed to all interests for comment, acceptance or both.

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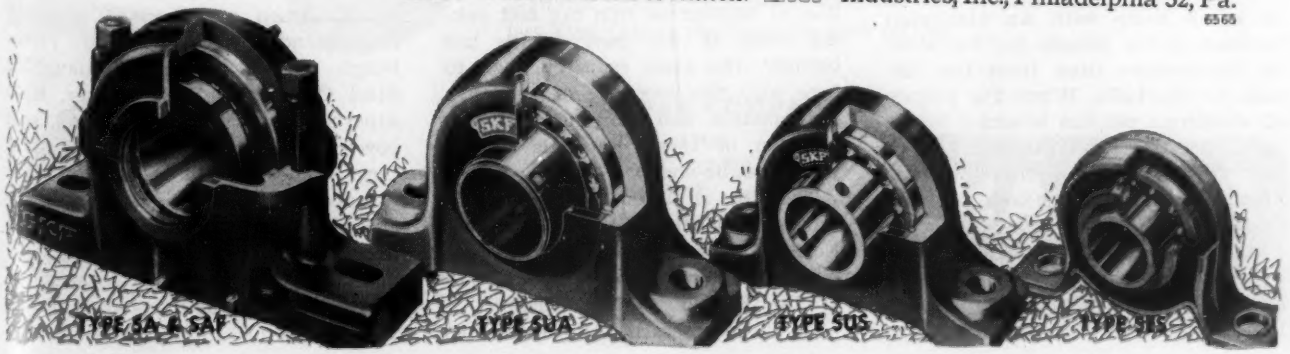

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Blast Furnace-Open Hearth Groups

CLARIFY OPERATING PROBLEMS

Important details on operating practice are presented at thirty-second conference of Mining and Metallurgical engineers at Chicago. Next year's meeting to be held in Cincinnati. Highlights of sessions follow

DESPITE handicaps of poor scrap and other raw materials, the steel industry last year produced 80,500,000 tons of ingots. This was made possible by better furnace combustion, faster rebuilds of open-hearth furnaces, the use of oxygen and efficient management. This was brought out by E. G. Hill, director of metallurgy and development, Wheeling Steel Corp., Wheeling, West Va. and vice chairman of the Open Hearth Committee at the 32nd conference of the National Open Hearth Steel Committee and Blast Furnace, Coke Oven and Raw Materials Committee of the American Institute of Mining & Metallurgical Engineers, Palmer House, Chicago, April 18-20.

The McKune award including a check for $200 was presented to T. B. Winkler, metallurgical engineer, research department, Bethlehem Steel Co., Bethlehem, Pa., for his paper entitled "Liquid Iron and Steel Temperatures in Practice".

Mr. Winkler, in his McKune award paper, pointed out that the speed with which a bath changes in temperature is basically dependent upon the heat loss from the furnace, temperature difference between the flame and bath, and the amount of fuel being burned. Substitution of oxygen for ore has the advantage of more rapid increase in bath temperature. The speaker pointed out that addition of cold materials lowers the bath temperature though an addition of 1500 pounds of spiegel in 135-ton heats neither increase or lower the temperature.

Measurements of various grades of killed heats with an aluminum addition of 3¼ pounds per ton show no temperature drop from the furnace to the ladle. When 2½ pounds of aluminum per ton is added to the ladle, there is a temperature loss of only 20°; in the case of 1¼ pounds aluminum addition, the loss amounts to 40°.

A digest of the various papers presented at the technical sessions on basic steel practice, as well as important comments, are as follows:

Methods of Desulphurization of Pig Iron, by E. P. Best, plant metallurgist, A. M. Byers Co., Ambridge, Pa.: Primary essentials for successful ladle desulphurization of molten pig iron are (1) maximum surface contact between reacting hot metal and desulphurizing slag. (2) temperature and (3) absence of contaminants.

In connection with agitation, the resultant slag becomes foamy when solid sodium hydroxide is melted in contact with the molten iron. This foaminess is caused by the dissociation of water from the hydroxide. It has been found that with this physical condition, desirable intimate contact is not fully obtained between the metal and desulphurizer.

Upon completion of the tap, boiling and foaming subside and during reladling an effective intimacy is obtained. In its essentials some desulphurizing is accomplished in the tapping ladle but the important accomplishment in the first ladle is a conditioning of the molten desulphurizer to enable it to do the highest degree of desulphurizing when the contents of the tapping ladle are repoured.

Practice at the A. M. Byers plant is as follows:

1. About 28,000 pounds of hot metal is tapped from three cupolas melting at 55 tons per hour. The metal is received in open-top ladles on a truck; as the ladle fills three or four 100-pound cans of sodium hydroxide are added at intervals of the tap. This melts to form a desulphurizing slag. The reaction is violent and the slag becomes foamy and then quiet when the iron notches are botted.

2. This ladle is positioned beneath a crane and its contents poured slowly and deliberately into an empty hooded ladle. Intimate mixing of the metal and slag occur at the ladle lip. The empty ladle is returned to its truck and then to the cupola.

3. Hooded top ladle is removed and a third ladle pulled under the hooded top ladle to receive the desulphurized heat. The third ladle receives 27,000 pounds of the desulphurized metal for the converter.

In the initial ladle the solid desulphurizer is melted and some of the sulphur removed. In ladle No. 2 an additional quantity of the remaining sulphur is removed and the slag

(*Please turn to Page* 128)

Furnacemen Seek Means for Improving

QUALITY OF RAW MATERIALS

NOW that blast furnace operators are emerging from the immediate postwar period during which they were obliged to turn out maximum iron production, they are focusing their attention to an increasing degree on problems of the not-too-distant future related to raw materials supply and quality. Rapid depletion of high-grade iron ore and coking coals in the past decade has brought the steel industry face to face with the necessity of extensive beneficiation and more careful preparation of these materials in the years that lie ahead.

That this situation is fully realized was very evident at the AIME Blast Furnace, Coke Oven and Raw Materials Conference held April 19-20 at the Palmer House, Chicago.

At the business meeting conducted at the annual luncheon of the Blast Furnace, Coke Oven and Raw Materials Committee, T. F. Plimpton, superintendent, blast furnace department, Inland Steel Co., East Chicago, Ind. was elected chairman for the coming year to succeed Dr. T. L. Joseph, professor of metallurgy, University of Minnesota, Minneapolis, Minn. New vice-chairmen are R. W. Campbell, superintendent, coke division, Pittsburgh District, Jones & Laughlin Steel Corp., and H. V. Lauer, field supervisor, raw materials, fuel and power division, Carnegie-Illinois Steel Corp., Chicago. W. S. Unger blast furnace and coke oven engineer, Carnegie-Illinois Steel Corp., Pittsburgh, was re-elected secretary.

One of the important sessions of the conference was devoted to blending of iron ore. Four speakers pre-

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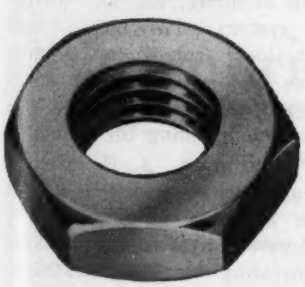

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senting formal papers on practices at their respective plants were C. L. Waggoner, general superintendent, Geneva Steel Co., Salt Lake City, Utah; R. R. Williams Jr., superintendent, blast furnace department, Colorado Fuel & Iron Corp., Pueblo, Colo.; E. J. Duffy, manager of operations, Kaiser & Frazer Parts Corp., Ironton Blast Furnace Division, Provo, Utah; and F. H. Crockard, product control engineer, ore conditioning plant, Tennessee Coal, Iron & Railroad Co., Birmingham.

These papers detailed practice of ore bedding by the Robins-Messiter system in the case of the Western plants and the silo system in the Southern plant. In each case, the ores available for use vary widely in analysis and blending is a requisite to provide uniform burdens for good blast furnace operation.

Mr. Duffy pointed out that the greatest obstacle to ironmaking in the West in the past was the belief that deposits of native ore were inadequate. In answer to this, he asserted that Kaiser-Frazer is mining by open pit methods in two locations. However, he made clear that typical of Western raw materials, namely, ore, coal and limestone, are the wide variations in chemical composition. Thus, beneficiation is imperative to get uniform blast furnace operation.

D. P. Cromwell, superintendent of blast furnaces, Campbell Works, Youngstown Sheet & Tube Co., Youngstown, O., pointed out that even in the case of Lake Superior ores, methods of handling them in water and rail shipment and storage give a reasonably good degree of blending. He mentioned that Gogebic ores need no blending and Mesabi ores get sufficient blending in their loading for shipment to docks, unloading in dock pockets, loading on ore boats and transfer from boats to storage piles. Some additional attention must be given the group ores to attain satisfactory blending.

One speaker pointed out that Western plants are restricted as to the analysis of ores available to them and have little latitude in varying their blend; Southern plants, which have more types of ore available and more latitude in blending, use an entirely different system. The point made was that local conditions suggest the degree of blending which must be done and the system to be employed in accomplishing the blending.

A. J. Boynton, A. J. Boynton & Co., Chicago, voiced the opinion that little can be done to improve the Robins-Messiter system for mixing solids, providing weather conditions

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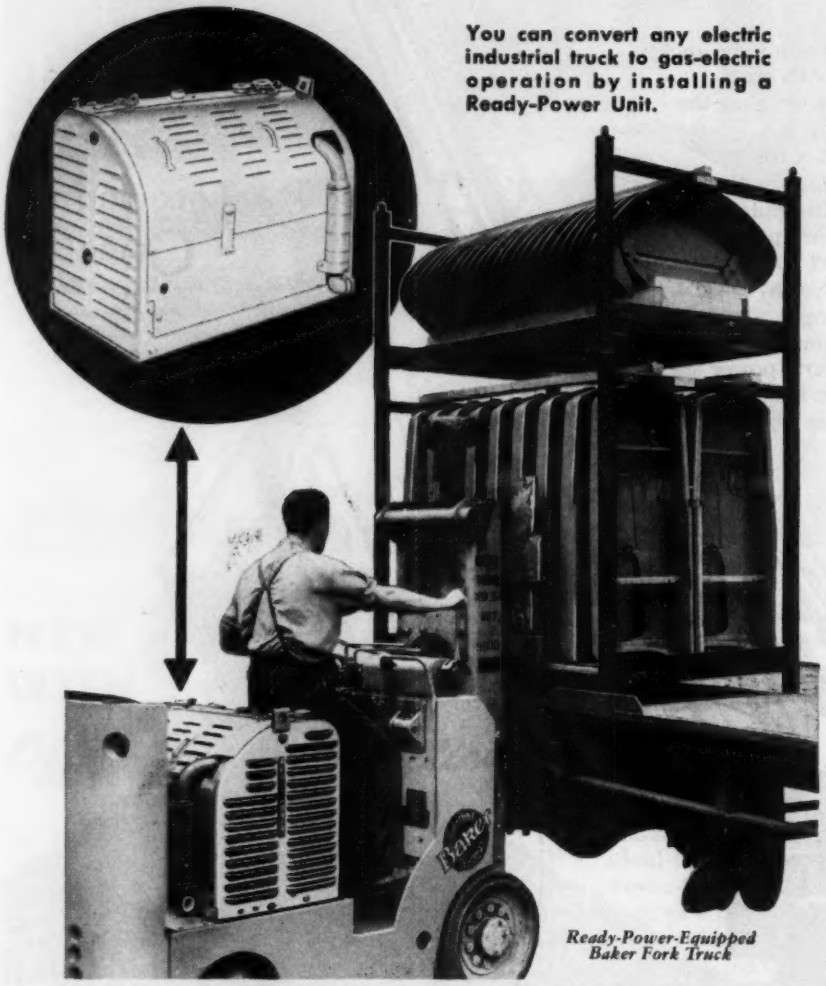

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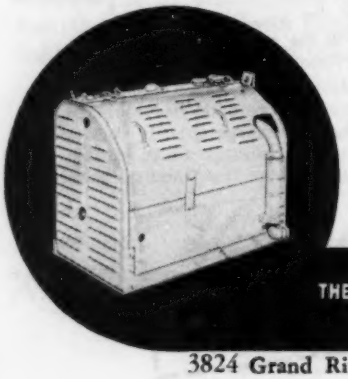

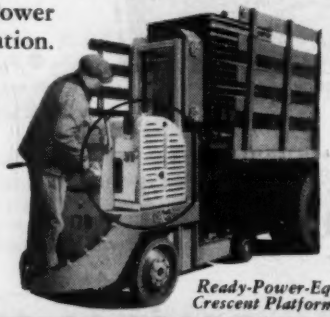

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do not interfere too greatly. He mentioned that bin storage of coal has good possibilities. The trend in increased coal variation, he stated, will be slow enough that it can be observed to aid in development of the most efficient blending system. He predicted greater use of bedding and that the increased uniformity of coking coal thus derived will be an important aid to blast furnace operations.

Another important session of the conference was that dealing with agglomerating. Four papers were presented as follows: "Manufacture of Nodules from Fine Ore and Limestone at Buffalo," by A. A. Oesterle, Federal Portland Cement Co., Buffalo; "Manufacture of Nodules at Ironton, Ohio, Using Mesabi Fines and Blast Furnace Flue Dust", by E. F. Brownstead, assistant general superintendent, Alpha Portland Cement Co., LeMay, Mo.; "Operation and Practice, Producing Iron Sinter at Ducktown and Copperhill, Tenn., with Fine Flotation Sulphides", by R. R. Burns, assistant smelter superintendent, Tennessee Copper Co., Copperhill, Tenn.; and "Briquetting Fine Ores at Woodward, Ala.," by H. A. Byrnes, general superintendent, Woodward Iron Co., Woodward, Ala.

Treats Chemical By-Product

In 1940, the Federal Portland Cement Co., Buffalo, was asked by a steel company to treat or nodulize about 25,000 tons of the by-product from a chemical company, the product to be used in the open hearth. The paper by Mr. Oesterle described the procedure employed. The plant had two kilns and one was converted to the nodulizing operation. This kiln is 11 feet diameter and 175 feet long. The operation was performed successfully and later the second kiln was put to the same use, operations continuing until late 1945.

Experience as to the daily amount of ore processed was 700 to 750 net tons per day per kiln and the fuel varied between 200 and 210 pounds per ton. During the time the company was making nodules, it is estimated that more than a million tons was turned out. The author pointed out that converting the plant to nodulizing was a relatively simple operation and valuable experience was gained.

The work done at the Alpha Portland Cement Co., LeMay, Mo., during the war was an attempt to work out an economical and chemically satisfactory method for agglomerating blast-furnace flue dust for a steel company desiring to use the product in the open hearth. The two rotary kilns used were 100 feet long and

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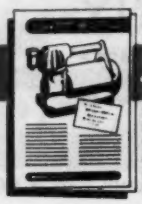

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8 feet diameter at the discharge end, and equipped with Fuller coolers.

These two kilns produced approximately 250 tons of nodules per day at a fuel rate of around 6000 cubic feet of 550 Btu coke oven gas per ton, or about half the fuel required to burn 1 ton of portland cement clinker. The yield was around 80 per cent of the material charged. During the nearly three-year period from 1943 to 1946, approximately one quarter million tons of nodules was manufactured.

Mr. Brownstead recommended that were his company to install new nodulizing equipment, it is believed the kiln should be from 10 to 11 feet diameter in the burning zone and around 150 to 175 feet long, as a larger area would permit the ring in the burning zone to build up and still allow sufficient combustion for efficient operation. In addition, the larger kiln would allow the burning off of the ring should it become too large, and would automatically increase the length of time the kiln could be operated without shutting down to dig out. The kiln would be equipped with a Fuller cooler or a modification, since it is believed the cooler plays an important part in the manufacture of nodules.

In discussion, H. M. Kraner, research engineer, Bethlehem Steel Co., Bethlehem, Pa., revealed that during the war his company had nodulized ore for open hearths in a cement plant and with satisfactory results. It was pointed out by M. F. Morgan, Arthur G. McKee & Co., Cleveland, that a small amount of carbon is beneficial to the nodulizing operation because of the heat it generates in burning.

Sintering of iron concentrates described by Mr. Burns was started by Tennessee Copper Co. in 1925, following the development of a selective flotation process for the treatment of ores containing the sulphides of copper, iron and zinc. Since 1925, the process has been improved so that now an unusually high-grade iron concentrate is produced. Sinter made from this material averages 68 to 69 per cent iron and only 1 to 2 per cent silica. To obtain this purity requires extremely fine grinding of the ore. The iron concentrate averages around 75 per cent minus 200-mesh and 56 per cent minus 325-mesh.

Over the past five years, sinter production rate expressed in tons in 24 hours for each square foot of windbox area has averaged 1.88 tons at Copperhill and 2.58 tons at Ducktown. During 1948, Copperhill averaged 2.0 tons and Ducktown 2.6 tons.

Mr. Byrnes explained in his paper that briquetting of ore fines as practiced by the Woodward Iron Co. is a means of beneficiating a raw material that otherwise would cause considerable difficulty if charged to the blast furnaces as mined. Following a series of experiments, the company installed a Komareck-Greaves briquette press of 25 tons per hour capacity in 1944. Sufficient tonnage of briquettes was produced to charge regularly in the furnace burden and results of the operation were so satisfactory that a second machine was installed in 1945.

The two machines have a combined capacity of about 60 tons of briquettes per hour. The mine production of fines is about 1200 tons per day, or sufficient ore for 20-hour operation. With a three furnace operation, the machines are operated 21 turns per week, the crew consisting of two laborers and one operator per turn, with part-time supervision of an assistant turn foreman. The binder used is ordinary portland cement which is dropped on top of the fine ore on the conveyor belt going to the pug mill.

The briquettes cannot be stocked successfully; handling and rainy weather cause them to disintegrate. Cost of briquettes, including all charges applicable to the operation except ore used is about 50 cents per gross ton. Of this amount, cement cost is about 20 cents and electric power about 1 cent per ton.

As applied to its practice, Woodward Iron Co. believes that briquetting is an entirely satisfactory process. Clear-cut comparisons of blast furnace practice before and after use of briquettes are not available, but as an indication, average flue dust per gross ton of pig iron in 1943 with no briquetting was 117 pounds per ton; in 1945, the first full year's operation with briquettes, it dropped to 69 pounds per ton; 1946 to 62 pounds; 1947 to 60 pounds; and 1948 to 54 pounds.

Operating differences between large and small blast furnaces was made the subject of a symposium which featured contributions by T. F. Plimpton, superintendent, blast furnace department, Inland Steel Co., East Chicago, Ind.; G. P. Burks, division superintendent of blast furnaces, Carnegie-Illinois Steel Corp., Gary, Ind.; J. Knox Dye, superintendent of blast furnaces, Armco Steel Corp., Ashland, Ky.; and C. F. Hoffman, superintendent of blast furnaces, Bethlehem Steel Co., Sparrows Point, Md.

In introducing the subject, Mr. Plimpton said the symposium sought

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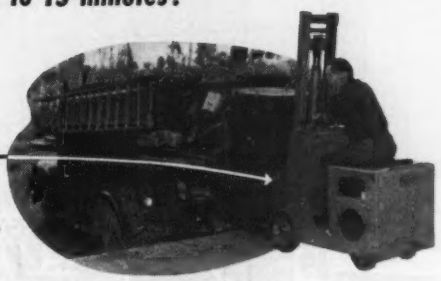

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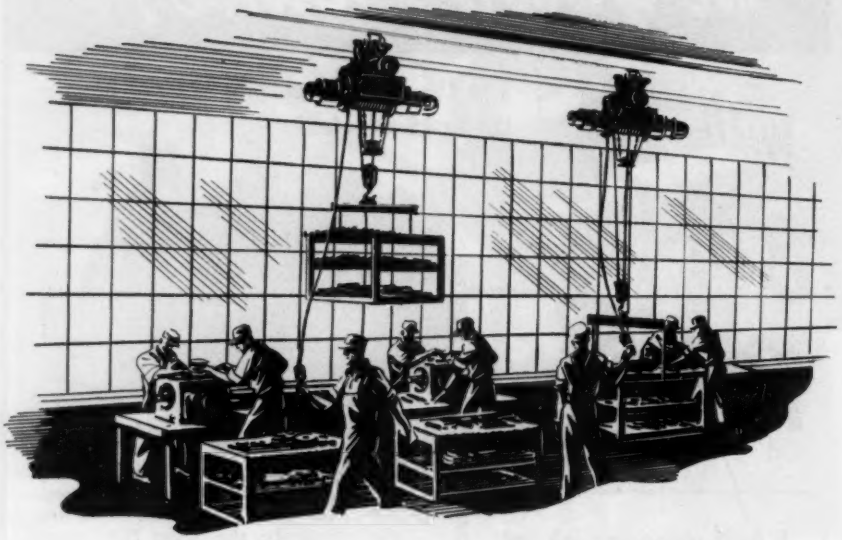

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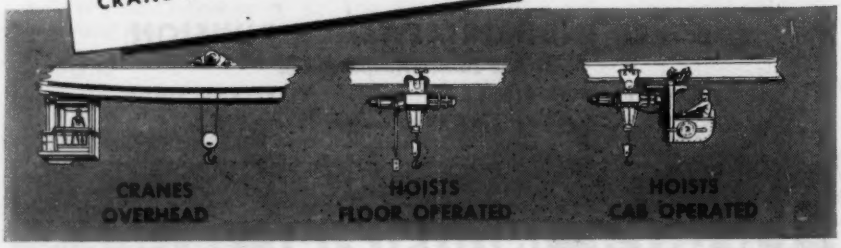

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an answer to whether the steel industry should build larger and larger furnaces or should stop at some given size. Inland Steel Co., he asserted, would appear to provide a good test because of the varying sizes of its eight stacks, but unfortunately other factors, such as raw materials, furnace lines, wind rates, etc., have a bearing and prevent an accurate test.

The speaker raised a question as to how furnace capacity should be calculated, namely, on the basis of square feet of hearth area, or on coke burning capacity by the annular ring at tuyere level method? He cited figures to show considerable variation in capacities arrived at by the two methods. As measures of furnace efficiency, he mentioned the factors of coke consumption, flue dust production and quality of iron.

A vital problem to blast furnace operators is the taphole because of the frequent breakouts which occur around it. It was Mr. Plimpton's observation that the taphole in large furnaces stands up as well as in small furnaces despite the greater amount of iron passing through the former. Quality of iron made in large stacks is as good as that made in small furnaces, and large units are as easy to control as small, despite some feeling to the contrary. On the other hand, the speaker stated that large furnaces get into one-sided operation easier than small.

Continuing, Mr. Plimpton asserted that weak fuel exerts a more harmful effect in a large stack, as compared to the small unit. Maintenance costs on the large furnace are higher, but are not proportional to the tonnage produced. In conclusion, he voiced the opinion that some advantage may be gained in going to still larger furnaces.

The primary conclusion reached from Mr. Burks' comparison of large and small blast furnace operations at Gary Works of Carnegie-Illinois Steel Corp. was that the iron production rate per unit of hearth area of large furnaces will approach that of small furnaces when high-grade raw materials are available for both. Conversely, as raw material quality deteriorates, the small furnaces can be expected to maintain a proportionately higher iron production rate than the large furnaces.

Coke rates of large and small furnaces remain comparable even while the trend is upward due to deteriorating quality of raw materials. Mr. Burks further pointed out that silicon content of the iron produced by large furnaces is more uniform, as indicated by standard deviation studies.

Average size of blast furnaces in

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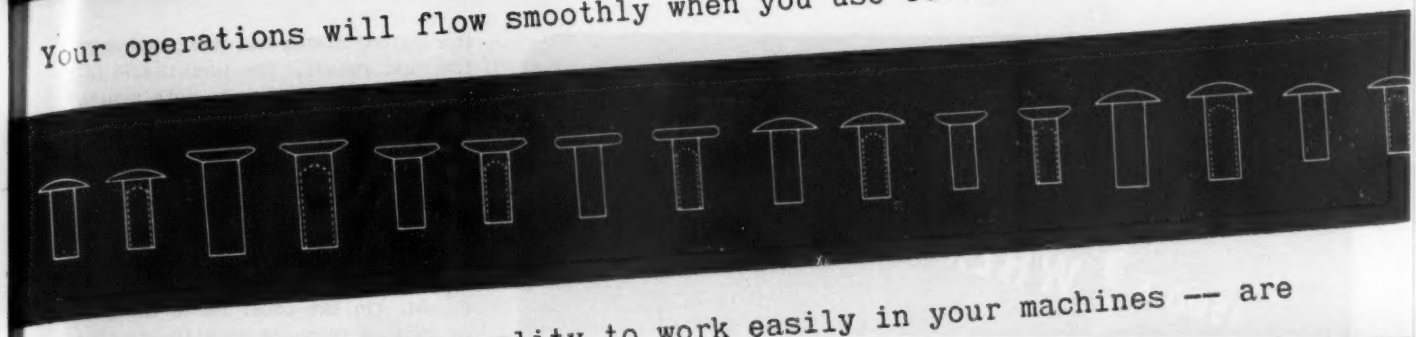

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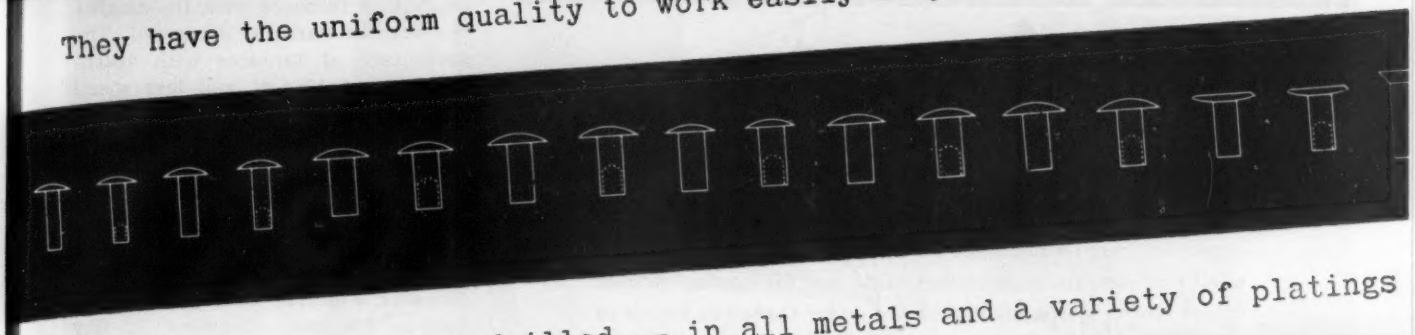

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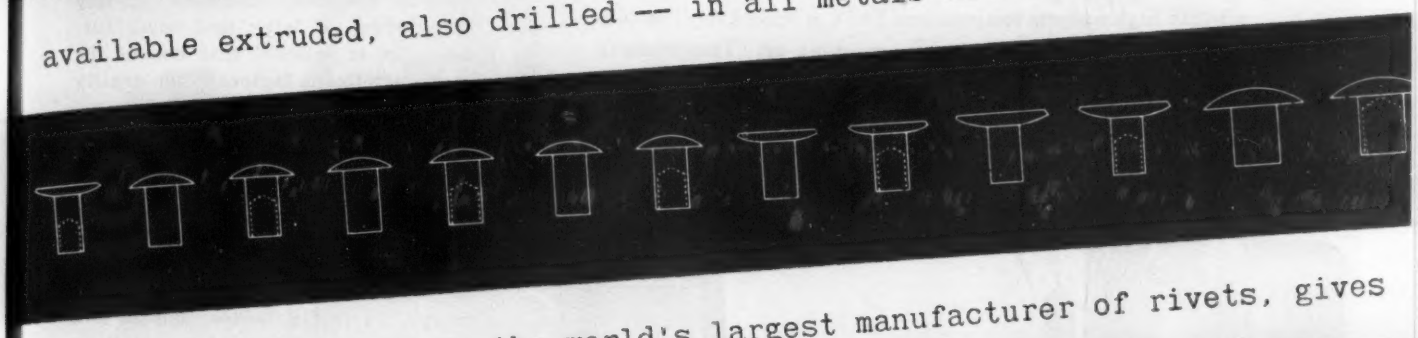

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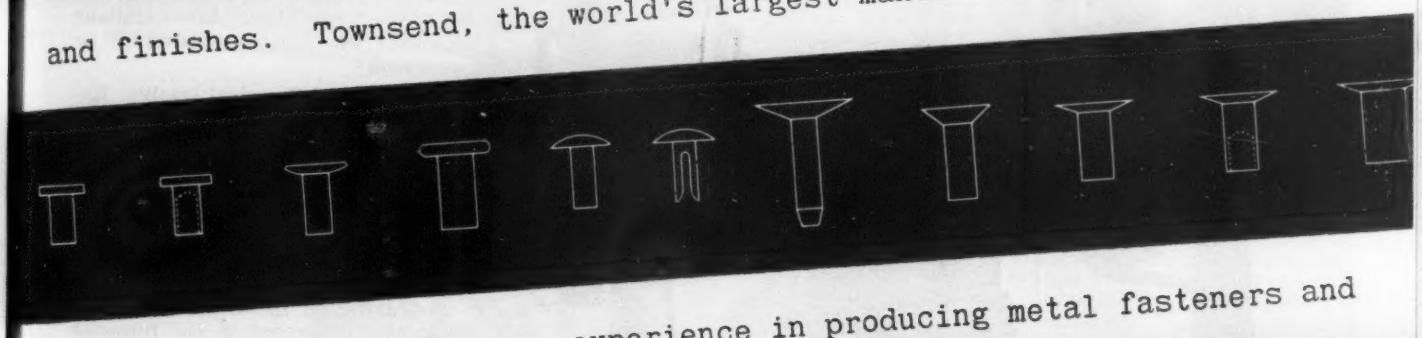

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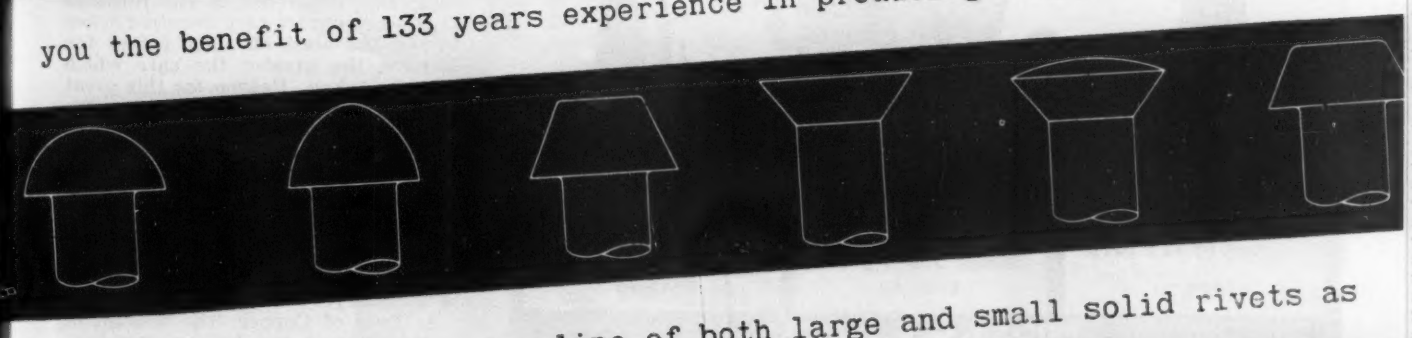

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the United States has increased over the past decade. The remarkable increase is in the furnaces with hearth diameters of 25 ft and over, increasing from 4.2 per cent in 1938 to 24.1 per cent in 1948. The percentage of furnaces having hearth diameters between 20 and 25 feet increased in 1938, and thereafter remained practically constant, the speaker continued. On the other hand, the percentage of furnaces with the smaller hearths has markedly decreased. The percentage of furnaces with hearth diameter of 15 feet and less would probably decrease much more rapidly if the furnaces producing ferroalloys were omitted.

This trend, Mr. Burks said, has brought the discussion of furnace size into even more prominence as the proponents of large and small furnaces continue to expound their various theories. However, in any comparison of large and small furnaces, it is believed that one of the most significant factors is the quality of raw materials available.

Mr. Dye reported on a study of data pertaining to three blast furnaces at Ashland, Ky., for the purpose of selecting the items that best show characteristic differences in their operation. Hearth diameters of the three furnaces are: 13 feet 9 inches, 14 feet 6 inches, and 25 feet 9 inches, respectively. Investigations indicated the following items to be prominent:

1. Control of Chemical Quality. Results indicated that the duration of furnace swings is directly related to the control of quality of production. As the furnace size increases, they increase and the relation of operating control of quality and duration of furnace swings compared with furnace sizes can be a straight line or a curved line.

2. Taking off the Wind. The most noticeable difference in the furnaces is the amount of care required when taking the blast off. The larger the furnace, the greater the care which must be taken. Reason for this great difference lies mostly in the coke. The coke breaks badly in the large furnace and the hearth usually is filled with small coke, which prevents the slag and iron from draining freely from the tuyere area.

3. Handling the Iron. More care is required as furnace size increased. Likewise, more taphole maintenance is necessary.

4. Loss of Copper. The amount of copper burned can be considered as an indication of how the furnace is operating. Only the copper in the stack is considered. Data indicate that loss of tuyeres, coolers and monkeys varies directly with the furnace size. The loss of bosh plates varies indirectly with furnace size.

Mr. Hoffman declared that comparisons of furnace size are of no value unless conditions under which they operate are identical. He doubt-

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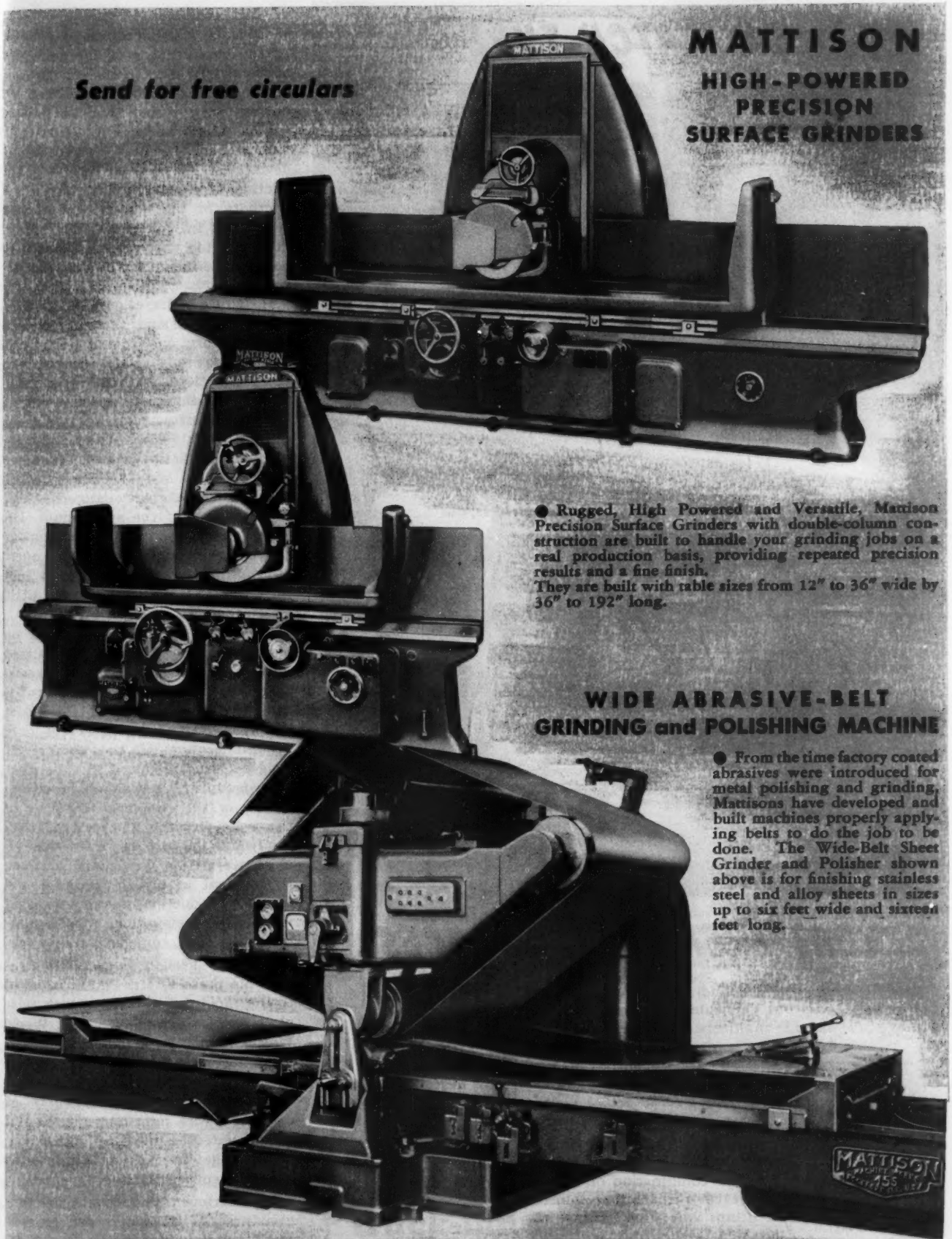

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● From the time factory coated abrasives were introduced for metal polishing and grinding, Mattisons have developed and built machines properly applying belts to do the job to be done. The Wide-Belt Sheet Grinder and Polisher shown above is for finishing stainless steel and alloy sheets in sizes up to six feet wide and sixteen feet long.

MATTISON MACHINE WORKS

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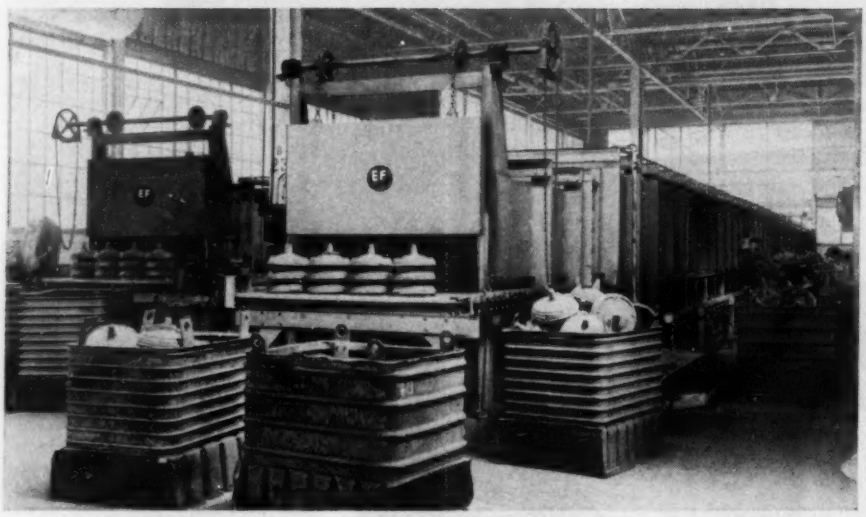

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Shown at the top is an EF double chamber car type furnace for annealing castings. It employs three furnace cars and a transfer car equipped with a car puller. Just below is an EF combination oil and gas-fired continuous roller hearth furnace that anneals 14,000 pounds of brake drums and other castings per hour.

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ed that coke consumption increases as furnace size increases. He compared two furnaces of his company at Sparrows Point, one of 28-foot hearth and the other of 19-feet diameter, then stated that the larger one has the advantage in quality control, probably because it smooths out deviations. As to coke rate, the advantage is with the larger stack. Productivity of the larger furnace also is better. In conclusion, Mr. Hoffman asserted that a large furnace is no more difficult to handle than a small one.

H. F. Dobscha, assistant district manager, Cleveland District, Republic Steel Corp., in discussing the symposium papers gave his opinion that there is little difference between the two blast furnace capacity rating methods when certain conditions are specified. He asked the audience: "Would you build two small furnaces or one large one?" The ensuing laughter bespoke a negative answer. In summarizing the symposium, Dr. T. L. Joseph said it would appear that in the future blast furnace operators might have to watch raw materials for large furnaces a little closer than for small ones.

Effect of coke characteristics on blast furnace operation was discussed in a paper which J. F. Peters, assistant superintendent, blast furnace department, Inland Steel Co., East Chicago, Ind., presented at the only general session of the conference. Evidence was produced to show that the amount of breeze made during coking of the coal and traveling of the coke through the system is a good index of furnace production. A close correlation was found between the amount of breeze produced and furnace production, maximum wind rate, coke consumption, volatile matter in the coke, tumbler stability factor and the peripheral gas flow.

In his preface, Mr. Peters referred to the rapid deterioration which took place soon after the start of World War II in quality of the coals used to make metallurgical coke for production of iron. This deterioration was caused by the greater amounts of coal that were mined by mechanical means, with the resulting higher ash, and by the inferior coals mined to meet the unprecedented demand.

The detrimental effect on blast furnace practice of higher ash in coal and the resulting coke has been established, he asserted, and there are many references in the literature on that subject. Experience of Inland Steel Co. has confirmed these findings and the company has recent additional data demonstrating how the higher coke ash, with re-

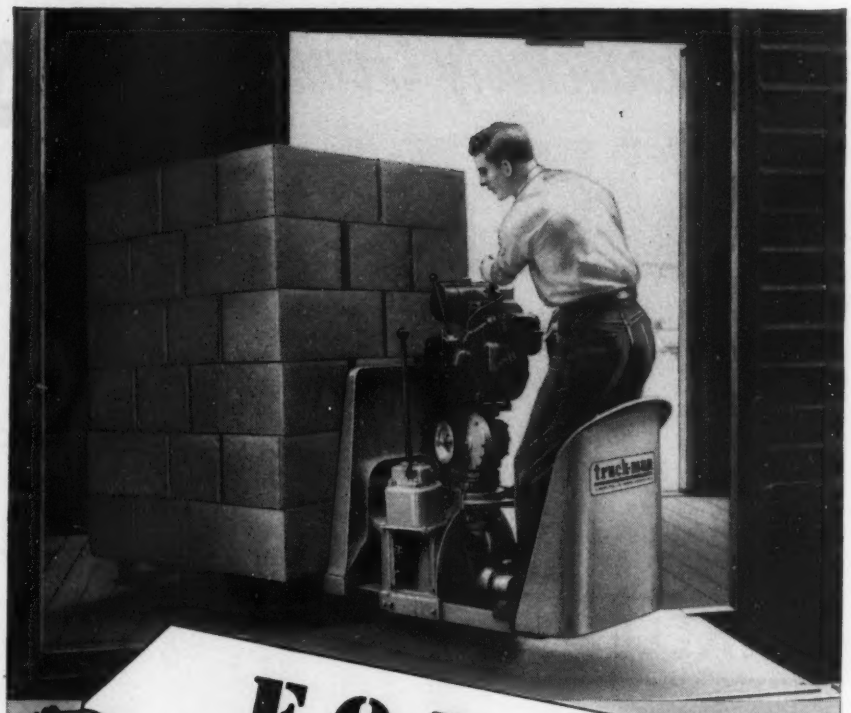
sulting higher slag volume causes a decrease in the tonnage of iron produced.

During the past 15 years, Mr. Peters continued, a study has been under way at the Inland plant, the purpose of which has been to relate certain objective qualities of the coke with blast furnace operation. This work has established that under certain conditions coke size and analysis are significant measures of coke quality.

However, size and analysis are only two of the many qualities of coke. The value of coke for the blast furnace is determined by the sum total of all its qualities. The speaker stated there had been no attempt to measure all of these qualities, but attention had been centered on the study of coke stability and an attempt make to correlate the stability with the amount of breeze screened out of the coke and in turn to correlate these data with blast furnace operation.

A paper co-authored by C. C. Russell, Michael Perch and J. F. Farnsworth, chemical engineers, research department, Koppers Co. Inc., Kearney, N. J., reported on an investigation to throw light on the subject of reducing coal expansion pressure in coke ovens. Mr. Russell, who made the presentation, pointed out that certain mixtures of two or more coals can distort oven walls. It was stated that no work had previously been done to determine what pressures are safe for the oven structure. The research was performed in movable wall ovens, 17 of which have now been built. It was brought out that no known damage to coke ovens has resulted where pressures have not exceeded 2 pounds per square inch. Among factors which were found to have a bearing in expansion pressure are density of the charge and flue temperature.

New design of equipment for recovery of ammonium sulphate and ammonia was described by Hans Otto, Otto Construction Corp., New York. During and since the war, many plants have been obliged to handle more gas that equipment was designed for, the speaker emphasized. Thus, it has been necessary to reduce back pressure. Mr. Otto said that his company was the first to design a new saturator, which features a larger cracker pipe and mouthpiece. The new design utilizes alloys—monel metal and stainless steel, eliminating use of lead—which makes for economical installation. Equipment involves a spray saturator for ammonia removal. Among advantages of the equipment mentioned



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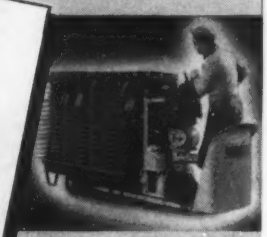

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- Round-the-clock operation . . . no layups for battery charge . . . no battery charge equipment to buy.
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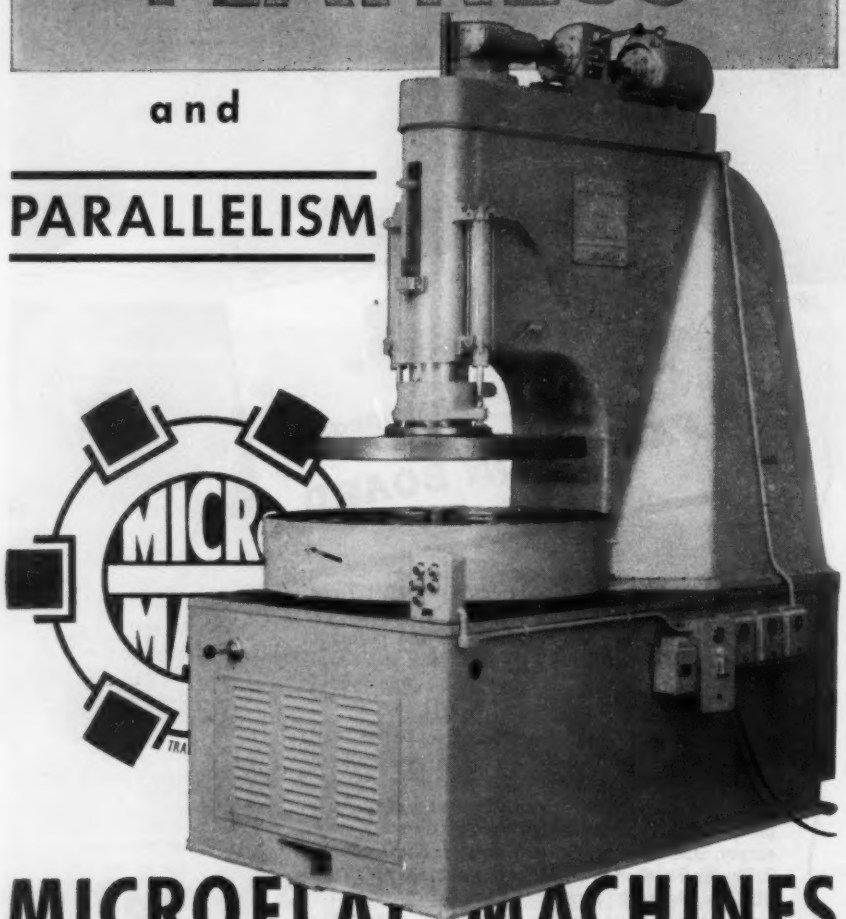

MICROFLAT MACHINES

24 sets—48 parts—of these hardened Gerotor pump gears are finished simultaneously on a Model 844-2 MICROFLAT machine. The surface is optically flat and parallel within 0.0001 inches. Production is approximately 1200 parts per hour.

Double Surface MICROFLAT machines provide a high production method of generating parallelism between two opposite faces of a part, in one operation. This is accomplished by mounting a number of parts in fixtures which rotate about their own centers while turning around a pivot gear. Lapping plates, above and below the fixtures, revolve in opposite directions about the common center. This assures that every point on each surface will be abraded by the full area of the plate. Loose abrasive is automatically applied to the plates. The operation of these machines is simple and the results are consistently accurate.

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by Mr. Otto were small size, requires fewer operators and eliminates necessity for standby facilities. Three installations have been completed to date.

Operating Problems

(*Continued from Page* 110)

is mechanically skimmed. The third ladle is merely a receptacle used for transporting the desulphurized iron to the converter.

With the sulphur in the iron ranging from 0.10 to 0.15 per cent a 7.4 pound per ton hydroxide addition will develop desulphurized metal in a range of 0.030 to 0.035 per cent sulphur at an overall cost of about $0.45 at current prices. With an increase in the sulphur content of the iron and a greater degree of desulphurizing required, down around 0.015 per cent, the cost at present prices will increase to about $1.00.

Comment on this paper brought out the fact that only ¼ of 1 per cent carbon is lost in the desulphurizing process. Sodium carbonate will remove 82 to 87 per cent of the sulphur whereas caustic soda will remove 90 to 95 per cent. Concerning sulphur revert, the speaker brought out that on basic iron about 65 per cent of the sulphur passes on as a gas in 2 or 3 minutes after contact with the desulphurizing medium. The balance charged into the open hearth does not revert.

Use of Blown Metal in Stationary Furnaces, by S. J. Dougherty, metallurgical engineer, Weirton Steel Co., Weirton, W. Va.: The best conception of Weirton Steel Co.'s use of blown metal is to picture the charging and working of a conventional scrap-hotmetal heat using an iron of high temperature and of composition which requires less flux. We thus have the obvious advantages of a faster charging, faster working heat, producing greater tons per hour at lower fuel costs.

Present practice calls for a blast furnace iron of 1.20 to 1.40 per cent silicon, 1.00 to 1.15 per cent manganese. Phosphorus in the iron is 0.360 per cent. This hot metal is blown down to 1.75 per cent carbon in the converter in approximately nine minutes with about 12 per cent steel scrap. Steam is used occasionally when scrap is light or iron is high in silicon.

The resulting blown metal is then poured into a furnace which has already been charged with limestone and scrap. The charge consists of 70 per cent blown metal, 30 per cent steel scrap and 5 per cent limestone. Burnt lime is used only as a slag corrective during the working of the

IF YOU USE STAINLESS STEEL here are the results you can get by changing to *Carpenter* Stainless

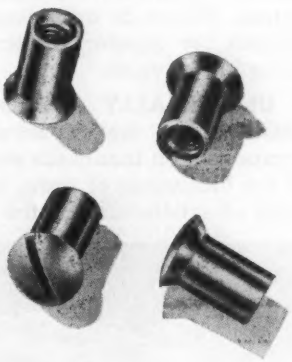
If you are hard to convince—if you believe that all Stainless Steels of the same Type Number are alike, look at the jobs shown here.

Each of these jobs was first done with the same type Stainless from another source, but look at the savings when the change was made to Carpenter *Free-Machining Stainless.*

The reason for savings like these is uniform free-machining properties in bar after bar of Carpenter Stainless, no matter when you buy it. If you want proof that you can cut costs on Stainless machining jobs, send your next production order to your nearest Carpenter warehouse listed below.

UNIT PRODUCTION UP 15% ON THIS JOB

These small instrument parts are machined to close tolerances: ±.0002" on the diameter, ±.0005" on the length and ±.0003" on concentricity. Several kinds of Type 303 Stainless were used, but unit production per shift went up 15% when the change was made to Carpenter Stainless No. 8 (Type 303).



REJECTS CUT BY ½

You can't afford many rejects on mass production low cost jobs. When this change was made to Carpenter Stainless No. 5 (Type 416), rejects were cut in half and tool life increased 25%.

23,400 BONUS PARTS

Longer tool life, less machine down-time, accounts for 23,400 extra parts per run—and the company saves $456.00 per year on tool regrinding now that Carpenter Stainless No. 8 (Type 303) is used.

Stainless Machining "Know-How" Is a Help on Every Job . . .

Useful machining information collected in our work with users of Stainless has been put into the 96-page Carpenter "Notebook on Machining Stainless Steels". For your copy, send us a note on your company letterhead, indicating your title. For the men in your plant, additional NOTEBOOKS are available at 50¢ apiece.

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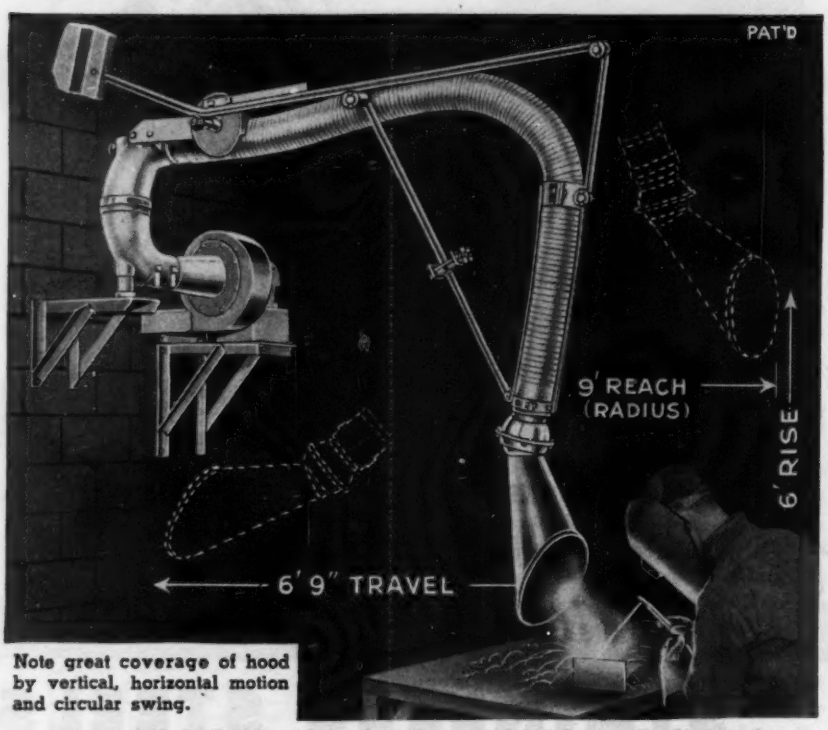

Note great coverage of hood by vertical, horizontal motion and circular swing.

Standard Model D-5310 with hood reaching out 9 feet from wall. Also available in Long Reach Model D-5342 with hood reaching out 15 feet from wall.

For complete details write for New Bulletin 37-D, just off the press

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heat. These heats are worked in the same manner as the conventional scrap-hot metal charge.

Scrap charging time for the 400 ton furnaces is three hours and thirty minutes. Blown metal is added about one hour and thirty minutes later. The average temperature of this metal is 2650°, which is 250° higher than blast furnace iron at this point. Average heat time tap to tap is 14 hours at a rate of 28.6 tons per hour compared to tap to tap of 21 hours on scrap-hot metal charges at a rate of 19.0 tons per hour.

Recent Developments in Hot-Top Designs and Relative Efficiencies, by E. W. Pierce, chief metallurgist, South Works, Carnegie-Illinois Steel Corp., Chicago: Extensive experimental work with hot tops, in regard to their efficiencies, has been done at South Works. Early investigation with standard clay and standard C&D hot tops revealed that volume ratios (hot top to total ingot volume in the molten state) of approximately 15.5 and 14.0 per cent, respectively, were the lowest possible for satisfactory product. This work indicated that further increases in product yield, from hot-topped ingots, could be obtained only by a more efficient hot top.

Most recent investigations have been with a number of different tops on a 25 x 25 x 68-inch big-end-up mold. These are: Insulated clay hot top, restricted C&D hot top, experimental clay hot top, and cement hot top.

All of these various types have been used in production runs and, based on sheer observations, transverse macro etch tests and actual rejections, the following relative efficiencies represent experience to date. The solid standard clay hot top is considered as a base for comparison in each case.

1. The insulated clay hot top, based on quality, produces a top product comparable to that of the standard clay, with a reduction in hot-top volume of approximately 2.4 per cent. Care must be observed in handling this type due to excessive cracking and breakage. Chipping during setting requires additional mold cleaning.

2. The restricted C&D top, based on quality, produces a top product comparable to that of the standard clay, with a reduction in hot top volume of approximately 2.4 per cent. Proper preparation of this top is required prior to setting to eliminate need for mold siphoning before use. This top affords more flexibility in pouring height. Additional work with this top on larger big-end-up ingots has produced satisfactory results.

3. Results of the small sample of experimental clay hot tops showed these to be inferior to standard clay tops. The cement hot top has been used only on trial runs to date.

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Business and the national economy benefit too. Savings Bond dollars are deferred purchasing power—an assurance of good business during the years to come.

Of the nation's 38,000 companies employing 100 or more people, over 20,000 firms are operating the Payroll Savings Plan—the popular system by which employees invest in U. S. Savings Bonds every payday. These companies report *internal benefits* from the Plan: reduced absenteeism, lower accident rate, increased production. Such results are, of course, manifestations of the sense of greater security the employees feel as their investment in Bonds grows. It naturally follows that employee-employer relations improve as well.

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Obviously each company benefits in proportion to the percentage of its employees who participate in the Plan. Nation-wide experience indicates that 50% of the employees in your company can be persuaded to participate *without high-pressure selling*. Here are five steps which have proved to be the "magic formula" for putting over the Plan. They will get results for you:

1. See that a top management man sponsors the Plan.

2. Secure the help of your employee organizations in promoting it.

3. Adequately use posters and leaflets and run stories and editorials in company publications to inform employees of the Plan's benefits to them.

4. Make a person-to-person canvass, once a year, to sign up participants.

These first four steps should win you 40-60% participation. Normal employee turnover necessitates one more step:

5. Urge each new employee, at the time he is hired, to sign up.

Check up on the Payroll Savings Plan in your company. If fewer than half of your employees are participating, you have a lot to gain by following the five-step program outlined here. All the help you need is available from your State Director, U. S. Treasury Department, Savings Bonds Division. While it's on your mind, why not call him right now? Or write the Treasury Department, Washington 25, D. C.

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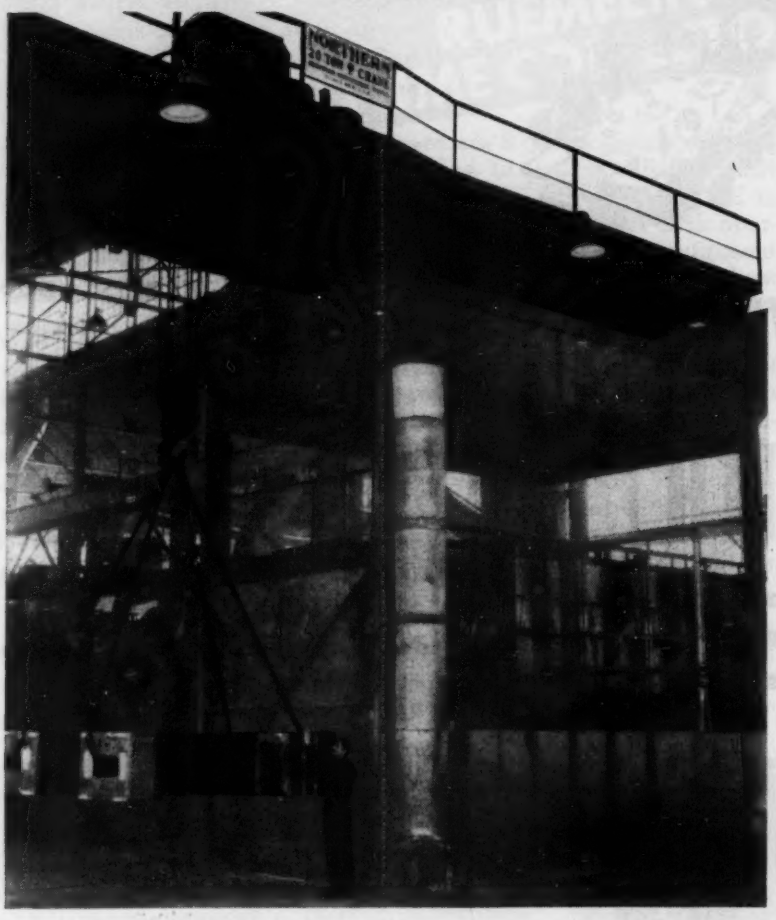

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NORTHERN ENGINEERING WORKS

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Mixer Linings (Special Brick), by Addison Maupin, ceramic engineer, Republic Steel Corp., Cleveland: Use of silliminite brick in the lining of metal mixers reduced cost at one plant 8 per cent during one campaign. At a plant in the Pittsburgh district, mica schist and chrome magnesite brick as mixer lining materials gave unsatisfactory life. Intermediate duty clay brick affords a life of 14 months allowing 1,300,000 tons of metal to pass through the mixer. A plant in the Youngstown district operating a 600-ton mixer uses first-quality fire brick, 22½ inches for the walls and 13½ inches for the roof. Silliminite brick is used in the backwall. At a Pittsburgh plant operating a 600-ton mixer, the roof of first-quality brick is 13½ inches thick and affords a life of 8 to 9 years. The pouring spout on this mixer is 8 feet long, mounted on wheels and is water cooled. Approximately 100,000 pounds of hot metal always is carried in the mixer in order to protect the bottom during the pour-in.

Mixer Linings (Rammed Mix), by F. A. Colledge, masonry superintendent, Carnegie-Illinois Steel Corp., Munhall, Pa.: Use of plastic superduty fire clay ramming mix was first considered at Homestead for patching small eroded sections in metal mixtures. A few such patches were satisfactory.

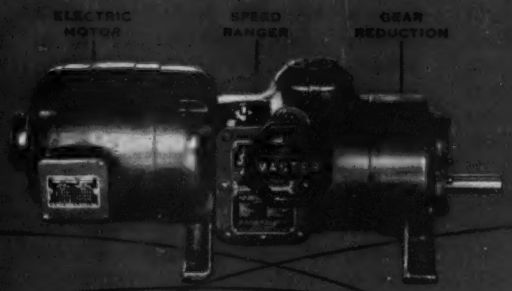
Later more extensive repairs to a 1000-ton mixer lining were made on the back, end and frontwall sections. About 32 tons of superduty plastic fire clay ramming mix were used to complete the installation.

A heating up schedule was maintained for 72 hours before metal was poured. During this time several small vertical cracks and a large crack at the top of the rammed section appeared. A few days later erosion appeared at these cracks. After three weeks erosion was so severe that the mixer was cooled and the eroded area rammed.

Examination showed that considerable metal was lodged between the plastic and the brick. As this was a general condition, it was not considered advisable to attempt patching and a brick lining was installed.

The author explained that the temperature of mixers vary to suit the operator's best practice, but invariably are not sufficient to obtain a ceramic bond. Therefore, little or no ceramic bond prevails with the plastic application.

Because of the size of the mixer and the size of the patch job and considering that the mixer is fired, it is felt that this installation was a



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Master Speedrangers provide this infinitely variable speed in compact, all-metal, mechanical variable speed units in a wide range of types and in sizes up to 5 horsepower.

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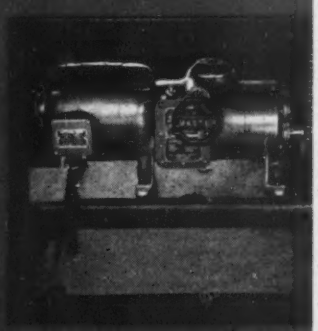

The all-metal construction of Master Speedrangers adds greatly to the compactness and durability of the job.

MASTER SPEEDRANGERS

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severe test for monolithic construction. It may be suitable for small patches in small mixers, but the application should not exceed a thickness of 6 inches. The author failed to note that plastic material in itself was equal or superior to brick.

Comment on this paper brought out the fact that moisture is eliminated in the patch merely by pushing holes into the material with welding rods. This prevents cracks at the outset and adds to the life of the lining.

Roof Life vs Silica Brick Quality, by H. M. Kraner, research engineer, Bethlehem Steel Co., Bethlehem, Pa.: Alumina and alkalies are exceedingly harmful. Alumina affects the roof life of a furnace; even 0.1 per cent makes a difference in the performance. An analysis now and then for alumina and alkalies is essential. Comparison of roof life without figures giving the consumption of brick is worthless. Strength and density tests of brick are just as essential as the analysis of brick.

Roof Life Versus Silica Brick Quality (Relative Effect of Alkalies and Alumina on the Refractoriness of Silica Brick), by L. L. Wells Jr., ceramic laboratory, South Works, Carnegie-Illinois Steel Corp., Chicago: On an equal weight basis, alkalies are about 1.6 times as effective as alumina and titania in depressing the refractoriness under load of silica brick. Whereas considerable attention has been concentrated on improving the refractoriness of silica brick by reducing the overall impurities, particularly alumina, a corresponding reduction in alkalies is necessary to achieve maximum benefit.

These conclusions are the result of work initiated several years ago at the ceramic laboratory of South Works to investigate the quality of silica brick from existing and potential suppliers and to establish any correlations that exist among the various properties of silica brick.

The study included determining the physical and chemical properties for each of about 25 samples of silica roof brick of six different brands. As a result of this work, the degree of correlation existing among the following variables was determined:

1. Apparent specific gravity, per cent unconverted quartz, and expansion on reheating for 5 hours at 2910° F.
2. The refractoriness under load and the chemical composition.

Of the impurities in silica brick, Al_2O_3, TiO_2 and alkalies are considered as detrimental oxides, as these are the oxides most effective in lowering the softening temperature of the silica. Other oxides, in the amounts normally present, are of minor importance.

Data from load tests indicate that the effect of impurities on the refractoriness of silica brick is much more pronounced in brick of Eastern than of Western origin. This wide difference in behavior is believed to be directly related to the effect of alkalies, since the Eastern product inherently contains from three to four times more alkalies than the Western, even though the total of detrimental oxides may be essentially the same.

A Study of Factors Affecting Surface Quality of Various Steel Products, by L. R. Walker, Edgar Thomson Works, Carnegie-Illinois Steel Corp., Braddock, Pa.:

This paper is a discussion of some of the problems encountered at one steelmaking plant in producing semi-finished and finished material to acceptable standards of surface and internal quality.

One such problem is the improvement of the surface of low-carbon killed deep-drawing steel slabs. The main sources of rejections were large and small scabs and surface cracks.

Presence of cracks on the rolled surface of the slabs was the major source of rejection, and this cracking contributed substantially to increased conditioning costs and, to a lesser degree, to rejections of finished sheets. A study of the factors likely to influence the occurrance of cracked slabs indicated that the ingot heating practice was probably involved. Increasing the control temperature of the soaking pits used in heating the ingots by 35° F. and increased soaking time was productive of crack-free slabs, with pipe and blister rejections for the finished sheet at an acceptable level.

Presence of scabs and slivers on the slabs, while not a major source of slab rejections, was a principal cause of high conditioning costs. It was decided to experiment with faster teeming rates, the theory being that the metal in rising at a greater rate would dissolve most of the solidified splashed metal adhering to the side of the mold. The standard nozzle size in use was 2 inches. After preliminary tests, a 3-inch nozzle was tried on a series of 20 heats, making certain to obtain a fast initial teeming as compared to teeming with a cushion using the 2-inch nozzle. A close comparison of conditioning costs was encouraging, costs being decreased by 50 per cent. Since there were advantages to the open hearth, with few disadvantages, the 3-inch nozzle was adopted as standard, and conditioning required has been maintained at a new low level. Sliver rejections on sheets also decreased substantially, while pipe and blister performance was not adversely affected.

While the pipe and blister performance was normal and acceptable by past standards, it was still higher than desirable. While several factors were brought to light by investigation, by far the most important was that pipe and blister occurrence was confined almost entirely to two larger of three mold sizes. Since the holding time at the pouring platform was the same—1 hour—for all three sizes, the logical conclusion was that an increased holding time should be beneficial to ingots in the two larger molds. A trial run of heats was made with the holding time increased 50 per cent for the two large molds. Results were gratifying, as pipe and blister were greatly reduced. Rejections due to these causes were lowered to such an extent that the economy of a longer holding time was beyond question.

Experience with fast pouring rates on low-carbon killed steel indicated the wisdom of trying this practice on rail steel. At the end of a 3-month trial period using a 2½ instead of the standard 2-inch nozzle, it was apparent that piped rails were about twice as high as normal, so, although surface quality was improved significantly, the practice was necessarily abandoned.

It had been realized for some time that soaking-pit practice was an important factor influencing rejections for piped rails. Correlation of heating practice with pipe performance resulted in the adoption of a heating practice which further minimized pipe, and for this reason it was decided again to try faster pouring rates. However, instead of working with the 2½-inch nozzle, the 3-inch nozzle was adopted for operating reasons. Results were promising in that steel defects for a 3-month period showed a 29 per cent reduction, with the occurrence of pipe maintained at the same level as with the 2-inch nozzle. Another change which has been helpful to a lesser extent is the institution of the practice of molasses coating new molds.

For forging quality billets, requirements are conventional—good active bath, no late additions, proper deoxidation, pour with 2-inch nozzle in warm, coated molds and proper heating. The resulphurized grade of billet steel has much the same practice except that uncoated molds are used, and the ingots are moved immediately at "finish pour" and are charged as soon as stripped. If possible, they are rolled as soon as properly heated.

It doesn't pay to PINCH PENNIES

on

CUTTING FLUIDS

IN selecting cutting fluids, performance—not price—is the important factor. Savings pinched out in purchasing are often thrown out in the scrap pile. A large Milwaukee screw products company learned this in machining Type 304 stainless steel tube stock on a single spindle Cleveland Automatic, using Tantung high speed tools. Of several cutting fluids tried for this operation, D. A. Stuart's ThredKut 99 with paraffin oil was found to be the only one which would enable the shop to produce this job at a profit.

On the forming operation, ThredKut 99 permitted production of 500 to 600 pieces per grind, as compared to only 100 to 135 with other oils; on drilling 300 to 400 pieces with ThredKut 99, only 75 to 100 with other oils; and 22 pieces per hour average with ThredKut, only 8 with other oils!

You can't get around performance records like these. Cutting oil at any reasonable price is a sound investment when it pays off in longer tool life, increased production and desired finish. You can buy cheaper oils and more expensive oils, but in this case as in most others, it is *wise economy* to buy the Stuart oil best suited for the job. Write for booklet, *Cutting Fluids for Better Machining.*

STUART *service goes with every barrel*

D.A. Stuart Oil Co.

2735½ South Troy Street, Chicago 23, Ill.

Melting Refractory Metals

(*Concluded from Page* 86)

type shown in Fig. 7, with a 6-inch diameter, water-jacketed copper crucible, to investigate the melting characteristics of larger sized titanium ingots. A feeder pipe was welded to the furnace top and connected to a length of 1-inch diameter rubber tubing filled with titanium powder. A gastight seal was made by clamping the extreme end of the tubing. An adjustable clamp next to the furnace permitted the feeding of powder at the desired rate. It was found that an initial charge of titanium could be melted across the 6-inch diameter crucible with a 1200-amp direct-current arc (electrode negative) in an argon atmosphere. However, much better melting could be obtained when the electrode tip was bent about 1 inch off center and rotated slowly during melting.

Fig. 6 shows an 19-pound titanium ingot which was melted in this manner. Increment charges of 3 pounds of titanium were melted for 10 minutes each with a 1200-amp arc (electrode negative). As mentioned earlier, no loss of tungsten from the electrode tip occurred when previously melted or thoroughly degassed melting stock was used.

A considerable increase in melting efficiency would result from continuous rather than interrupted feed of the melting stock and a further advantage would be expected from the use of a consumable electrode, as previously discussed.

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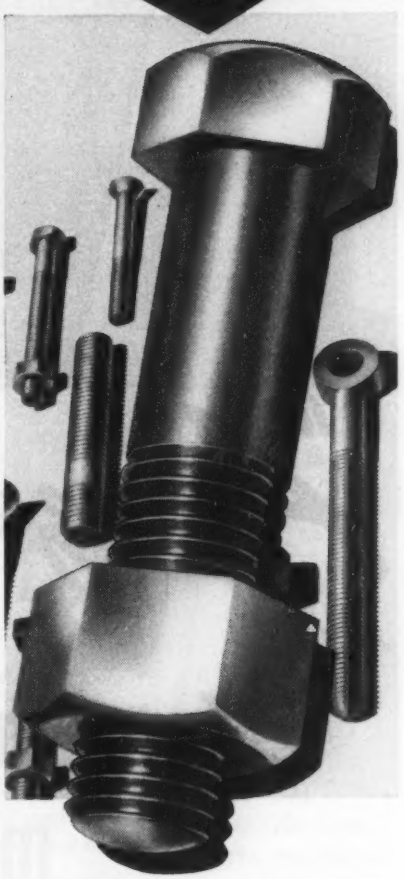
ACKNOWLEDGEMENT

Acknowledgement is gratefully extended to the U. S. Air Force and to Douglas Aircraft Co. Inc., Project RAND, for permission to publish this article which describes a portion of work sponsored by these agencies at Battelle.

First for BOLTS NUTS STUDS



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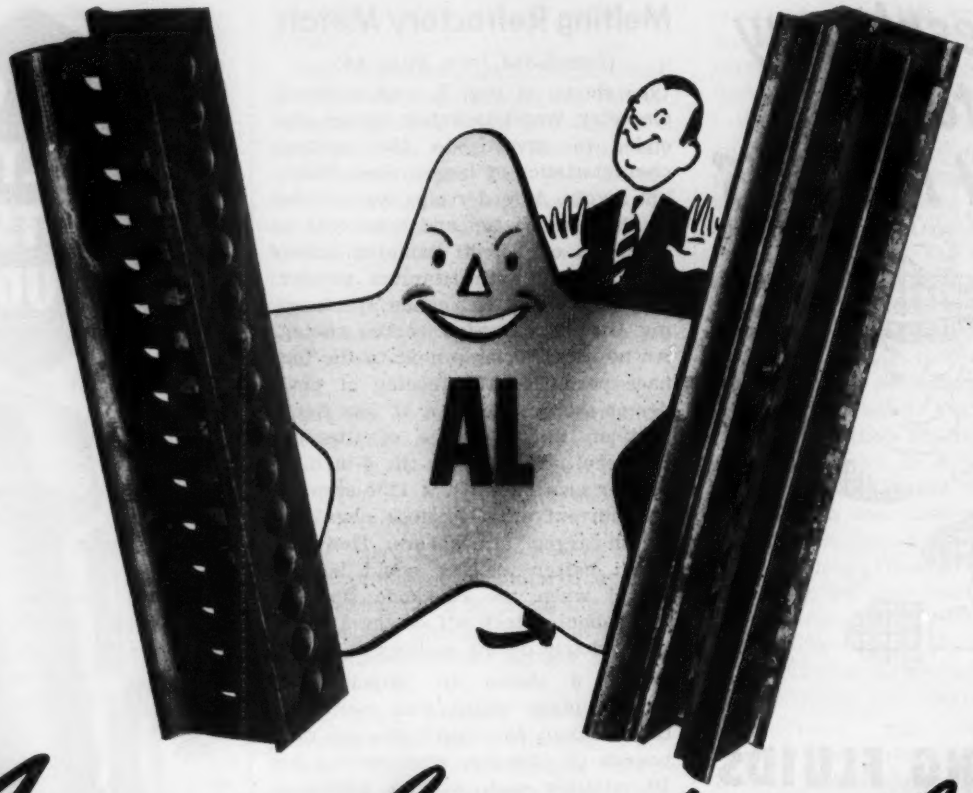

"Amazingly good results"
(SAID THE USER)

from this Gang Milling Fixture made of AIRLOY

There's an A-L Tool Steel to do each job best!

★

The Allegheny Ludlum Tool Steel family includes 37 principal types, covering the high speed, hot work, shock resisting, cold die, and carbon and low alloy steel fields. Let us help you find the best answer to *any* problem that occurs in your production or use of cutting and forming tools.

Address Dept. S-75

Particularly in view of the way it is cut up, the fixture shown above—made of A-L "AIRLOY" (a manganese-chrome-molybdenum air hardening cold die steel)—gave a performance that delighted the user, *and that's what counts!*

The fixture was designed to hold 15 small parts, 1/2" x 3/8", for milling a slot. In heat treatment, each fixture was first preheated at 1150° F., then raised to 1475° F. and held there for 7 to 8 minutes, then air cooled—resulting in a hardness of 62/63 Rockwell C. After a draw at 500° F., the final hardness was 57/58 C. Accurate measurement before and after heat treating revealed that there was *no change in sizes.*

AIRLOY is just one of eight principal types of A-L Cold Die Steels—hardenable from low temperatures, insuring low scale loss and freedom from cracking and distortion. One of these types can help you, and our Technical Staff is always at your service—no obligation.

ALLEGHENY LUDLUM STEEL CORPORATION
Pittsburgh, Pa.

TOOL STEEL DIVISION: DUNKIRK, N. Y.

Fine Tool Steels Since 1854 W&D 1780

Heat Treating Method

(*Concluded from Page 88*)

with the balance N_2 plus a CO_2 water-vapor content in equilibrium with the furnace temperature.

In the furnace chamber, inter-gas reactions take place between the components of the carrier gas, the hydrocarbon addition to the furnace and the ammonia addition. These reactions result in a state of gaseous equilibrium being approached in the furnace in accordance with equilibrium-state conditions for a given temperature.

Analysis of the gaseous atmosphere in the furnace along with equilibrium data for the furnace temperature will serve as a tool for evaluating the carburizing strength of the furnace atmosphere. Once the desired gaseous conditions have been established, it is only necessary to maintain those conditions to assure uniformity in the quality of the parts being processed.

Uniform Treatment Provided — A motor-driven fan (see Fig. 2) provides positive circulation of the furnace atmosphere. Directed by alloy baffle plates beneath the hearth, the gas is sucked down through the mesh-bottom work trays, thus permitting a uniform case even with bulk loading. Work is indexed through 360 degrees while in the furnace, further assuring equalized treatment.

As a result of this uniform treatment, there is very little warpage of work. For example, in heat treating one type of shaft, warpage had to be held to 0.003-inch. With liquid cyaniding, the shafts warped excessively and invariably needed straightening. When cyaniding was replaced by carbonitriding, warpage was reduced to 0.002-inch or less—below the specified limit—and the straightening operation was eliminated.

—o—

Pertinent information on the welding, soldering, cleaning, painting and fabrication of electro zinc plated sheets, is contained in a new book on electro-galvanized products, Form ADV-525, "Republic Electro Paintlok and Electro Zincbond Sheets", issued by Republic Steel Corp., Cleveland. It tells how the use of these products can save the manufacturer time and money and it also pictures numerous applications. Also included is a diagram illustrating the various steps in the electroplating process and the data on gages and sizes and base metals available.

An investment analysis that adds up to Savings

Investment protection with "Automatic" Sprinklers knows few limits from an application point of view. Take for example, B. Gertz, Inc., Long Island's largest department store which is shown in the illustrations above. Protected throughout by means of "Automatic" Sprinklers, the factors of true fire safety for thousands of daily customers and nearly two thousand valued employees is the management's primary aim.

But with the safety factor accomplished, let's analyze for a moment the financial considerations involved in this particular case. Insurance coverage on this multi-million dollar valued property is naturally high. Unsprinklered insurance rates would be prohibitive. Yet, based on estimates, "Automatic" Sprinkler **protection allows for premium reductions of better than 75%, amortizes the cost of installation in less than 4 years, following which annual savings of approximately $47,000 are realized.**

That's wise investment for Gertz, Inc., and it would be for you. An executive with the slightest appreciation of business economy could hardly overlook the importance of fire safety with "Automatic" Sprinklers, *an important investment today . . . perhaps welcome protection tomorrow.*

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO

TYPICAL "Automatic" Sprinkler PROTECTED PROPERTIES

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"Automatic" FIRE-FOG provides positive protection for severe fire hazards

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KEOKUK-WENATCHEE NOW ONE!

Chief Keokuk, the Indian Country's most eligible bachelor, has at last captured the heart and hand of the Redmen's favorite pin-up princess, the Wenatchee herself. Keokuk, mighty hunter, fearsome warrior, utterer of great metallurgical truths and his charming bride are shown in the informal candid photograph above. The couple is even now off on a honeymoon trip by covered wagon. The Chief claims his bride can average a five-mile-an-hour speed at the yoke if her new moccasins don't pinch her feet.

THE TOWN PRATTLER COLUMN

by Chief Running-at-the-Mouth

Chittum-Chattum on Keokuk Wenatchee Wedding: While the Big Chief and his lovely Princess were double-trailing it, the Keokuk Electro-Metals Company of Keokuk, Iowa, proudly established a new plant at Wenatchee, Washington. Wigwam news sources, known to be reliable, tell your copperskinned correspondent that the new division plant will begin at once manufacture of the famous ELECTRO-SILVERY pigs and piglets there in the heart of the Northwest's power-rich Inland Empire.

A late news flash on our private *tom-tom ticker* confirms the good word that these new facilities will practically double Keokuk's electro-silvery output and will permit stockpiling for improved shipping services throughout the West and Midwest.

Wenatchee, which the paleface translates as "Foot of the Rainbow," will now shoot out those silvery pigs and piglets from the shores of the Columbia River apple country while the Keokuk plant at the other end of the rainbow will continue shooting out an expanding silvery stream into the midwest and south. On the way to their ermine-trimmed nuptial wigwam the bridal couple was overheard to remark (and this is exclusive), "Heap big pile of pigs! Ugh!" (For paleface readers "Ugh" is translated "WOW!")

60-lb. pigs for steel plants

30-lb. pigs and 12½-lb. piglets for foundries.

KEOKUK

electro-silvery

BY KEOKUK ELECTRO-METALS COMPANY

KEOKUK, IOWA

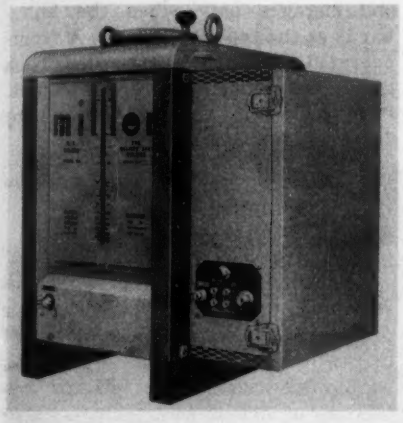
WENATCHEE DIVISION, WENATCHEE, WASHINGTON

SALES AGENTS: MILLER AND COMPANY, 332 S. Michigan Avenue, Chicago 4, Illinois. Cincinnati 2, Ohio, 3504 Carew Tower · St. Louis 1, Mo., 407 N. Eighth St.

New Products and Equipment

Welder-Timer Assembly

Requiring only connection to input power and argon gas, water lines and the Heliarc torch, the model 264-T welder-timer assembly announced by Miller Electric Mfg. Co., Richmond, Ind., consists of a model 271-A pneumatic timer with solenoid gas valve and flow meter assembled to a



model 264 alternating current arc welder for Heliarc spot welding. Arc welder features continuous current control with adjustment to a fraction of an ampere. It is provided with 220/440 v primary connection.

Pneumatic timer is wired directly to the arc welder, requiring outside connections only to input power, gas, water, ground cable and the Heliarc torch. The time in cycles to be used is selected by adjusting a control accessible through a side door of the timer case. For regular Heliarc welders of sufficient capacity, a Miller control apparatus for Heliarc spot welding is also available.

Check No. 1 on Reply Card for more Details

Air Cleaner

Seventeen per cent more dirt-trapping area and ability to handle a 10 per cent greater volume of air feature the new 99-plate, all aluminum industrial precipitron air cleaner, developed by Sturtevant Division, Westinghouse Electric Corp., Boston, Mass. Unit is built in two sizes: One 36-inches wide, the other 24-inches wide. Capacities are 1000 and 667 cubic feet of air per minute, respectively.

The 36-inch aluminum cell weighs 50 pounds. The lighter weight, combined with improvements in the frame and body design, make the unit easier and cheaper to install. Savings in the cost of flushing the collected dust from the plates has been made possible by simplifying and revamping the layout of the plates and dust-charging section.

Check No. 2 on Reply Card for more Details

Multiple Station Gage

Air-O-Limit, Electrolimit, and multiple contact gaging mediums are combined in a specially designed multiple station piston gage made by Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn. Nine critical dimensions—three ring groove diameters, top land diameter, dome height, skirt taper, skirt diameter, skirt squareness, pinhole diameter—on automotive pistons are checked simultaneously.

To operate the gage, the inspector places a piston on the automatic

loading mechanism and watches the lights and meters on the instrument panel. Piston is drawn automatically into gaging position and the nine dimensions are gaged simultaneously. Green lights indicate undersize and red lights indicate oversize dimensions. Three meters show variation in pinhole diameter, skirt taper and skirt diameter.

Check No. 3 on Reply Card for more Details

Power Supply

Continuously variable voltage output from 500 to 50,000 v with a maximum current output of 1 milliampere is produced by a wide range power supply apparatus announced by Special Products Division of General Electric Co., Schenectady 5, N. Y. Designed for laboratory applications where a variable voltage at low current is required, it can be used in electron diffraction and mass spectroscopy studies, research on high-intensity screens for cathode ray studies and electron microscopy.

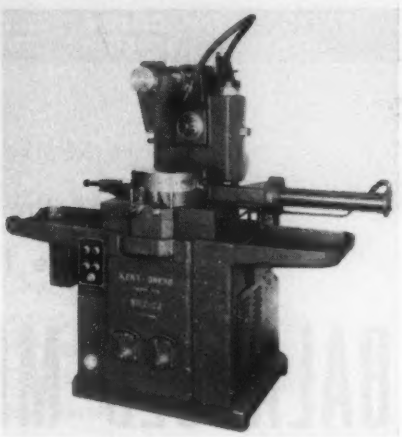
High voltage is attained through the use of a radio frequency oscillator, power amplifier, radio frequency transformer and a ladder-type voltage tripler circuit. Output power, supplied through a 15-foot x-ray cable, is not affected by variations in line voltage or frequency. A control panel provides for the selection of two ranges: 500 to 5000 v and 5000 to 50,000 v. Drift is less than 20 parts per million per minute on the low voltage range and less than 100 parts per million on the high voltage range.

Check No. 4 on Reply Card for more Details

Milling Machine

Feature of the No. 2-20 milling machine built by Kent-Owens Machine Co., Toledo, O., is a hydraulically controlled rotary table 16 inches in diameter. The table is driven by means of a gear and rack mounted at the rear of the fixture, the rack being actuated by a hydraulic cylinder. Desired cycle is obtained by placing the dogs in the proper position on the outside of the table.

Machine has twelve spindle speeds from 64 to 860 rpm. Drive has two



gear contacts from motor to cutter. Head is mounted on two cylindrical ground steel posts which carry the spindle midway between them.

Check No. 5 on Reply Card for more Details

Power Squaring Shear

Wysong and Miles Co., P. O. Box 2068, Greensboro, N. C., is introducing a power squaring shear with a capacity of 10 foot, 10 gage mild steel. Bed, end-frames, knife-bar, holddown and top-girder of the No. 10-10 shear are one-piece semisteel castings. Bed is squared with the end-frame in all three directions to insure accurate cutting. Eccentrics for moving the knife-bar through the stroke cycle are housed between two bearings within each end-frame.

The nine-jaw clutch is built of

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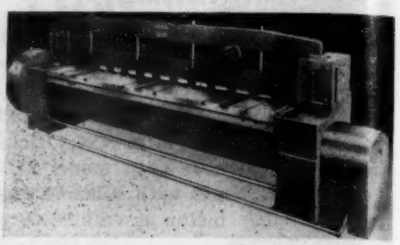
hardened, forged alloy steel. When foot treadle is depressed, the clutch of the under driven machine engages instantaneously and the load is distributed equally over all nine jaws. The knife-bar brake is cam-operated

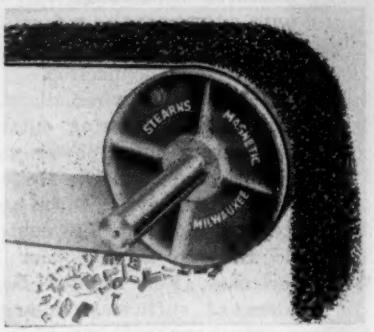


and engages only when the knife-bar is at the top of the cycle. A front-operated, ball-bearing parallel back gage is adjustable to 0.0078-inch. Power for the unit is supplied by 7½ hp motor.

Check No. 6 on Reply Card for more Details

Magnetic Pulley

Performing of such operations as removing tramp iron from raw or processed materials, separating of magnetic and nonmagnetic products, reclaiming secondary metals and protection of machinery, grinder, pulverizers or other equipment is the function of a permanent magnetic



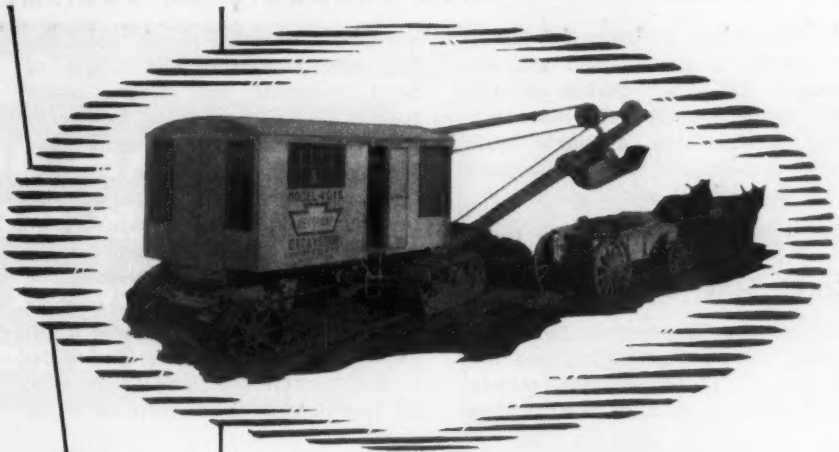
pulley with Alnico metal poles, announced by Stearns Magnetic Mfg. Co., Milwaukee 4, Wis. It has uniform high magnetic strength over the entire face of the pulley and can be operated under all atmospheric and temperature conditions. More than 50 sizes are available from 12 inches in diameter by 12 inches wide to 30 x 60 inches.

Check No. 7 on Reply Card for more Details

Directional Control Valve

Series DG solenoid-controlled two, three and four-way directional control valves are being made by Vickers Inc., 1480 Oakman Blvd., Detroit 32, Mich. Valve features include compactness, small solenoids, low inrush and holding current and open, closed and partially blocked valving modifications.

Maximum operating pressure is 200



1927. In 1927, this Twin Disc equipped Keystone Model 4 Gas Boom Swing Excavator with skimmer attachment was working on Missouri Highway 16, near Marionville, Mo.

1949. Keystone's modern Model 18-A, still Twin Disc equipped, can be found on many a job like the one being handled by the Spiniello Construction Co., Newark, N. J., shown below.

Keystone Combination

The first Twin Disc Clutch to be used by the Keystone Driller Company, Beaver Falls, Pa., was installed in the days of horses and wagons in a Keystone Model 4 Gas Boom Swing Excavator equipped with a skimmer bucket.

Today, Keystone's current diesel-powered Model 18-A Full Revolving Hoe . . . successor to the Model 4 . . . also uses Twin Disc Clutches for power transmission.

There are many leading manufacturers of heavy-duty machinery, who, like Keystone, have standardized on Twin Disc Clutches and Hydraulic Drives for more than two decades. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

JUDGE TWIN DISC BY THE COMPANIES IT KEEPS

UNIVERSITY OF MICHIGAN LIBRARIES

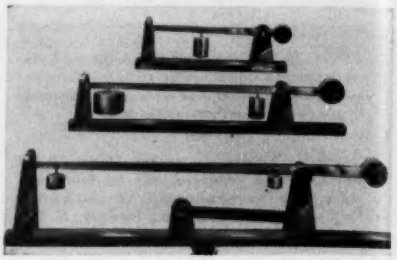
psi. Valves are available for piping sizes from ⅛ to 1¼-inch and are arranged for either gasket or subplate screwed connection mounting. Other models are available with flange connections for piping sizes of 1½-inches, 2½- and 3 inches.

Check No. 8 on Reply Card for more Details

Torque Beam Stands

Airdraulics Engineering Inc., New Canaan, Conn., is producing two new models of Trutorq beam stands, Model SDB-10 and SDB-50. They are used for testing power tools, setting and regulating the torque of hand, pneumatic and electric power tools in production use and for checking the tightness of fastenings and setting up torque standards. The two instruments, with the model SDB-25 previously announced, provide a range of torque measurement from 0 to 50 inch-ounces up to 50 foot-pounds.

Model SDB-10 has a range of from 0 to 50 inch-ounces, calibrated in increments of ½-inch-ounce. The model SDB-50 covers the range from 0 to 50 foot-pounds in increments of ¼ or ½ foot-pounds. All models have ball-bearing beam fulcrum and are accurate to a fraction of the unit measurement for each model. Each

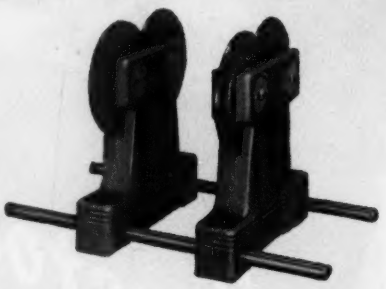


is fully tested and individually calibrated before shipment. Special models for measurements up to 150 foot-pounds are available.

Check No. 9 on Reply Card for more Details

Balancing Ways

All types of rotating equipment may be quickly and accurately statically balanced with the new balancing way announced by Crown Industrial Products Co., 1315 W. 69th St., Chicago, Ill. Units have hardened disks ground on the outside diameter and mounted on precision ball bearings for long life. Bearings are lubri-



cated and sealed when the unit is assembled.

Ways may be set up on the floor or on a bench and are then ready for use. No leveling is required. Revolving disks are mounted on solid end castings which are movable on two shafts to accommodate different sizes of work. Ways may be furnished in four sizes based on the length of work they will accommodate: 10, 20, 42, and 60-inch swings.

Check No. 10 on Reply Card for more Details

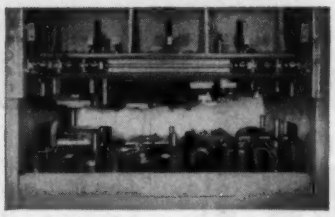
High Free Lift Truck

Total lift of 130 inches and a free lift of 65 inches with lowered mast height of 83 inches is incorporated in models LT-40, LT-44 and LT-48 lift trucks built by Towmotor Corporation, 1226 E. 152nd St., Cleveland 10, O. Trucks so equipped have good visibility for the operator and at the same time maintain standard capac-

DE-STA-CO Versatility WORKS FOR YOU!

Automatic Transmission Oil Pan. Formerly tied up two presses; now confined in one press with two dies, cutoff and draw and redraw. Result . . . saving on press labor, saving on handling.

The three parts illustrated are typical of the versatile performance we get from just *one* of our presses. By taking every advantage of modern, high-production equipment, large bed area, progressive tooling and every mechanical aid, we save for you—our customer. That's why buyers across the nation say: "For medium-large jobs and smaller, Detroit Stamping's our Number One source."



Washing Machine Water Intake Manifold. Originally used four presses. By use of four individual dies in one large press, savings of 25% on press labor, 30% on handling were obtained.

Analyze *your* component stampings. Probably there are several that could be handled better the De-Sta-Co way. You'll find it profitable and pleasant to join our distinguished clientele, customers who have helped us build a reputation for

- Reliability, resulting from 35 years of well-kept promises
- Helpful experience and tool-engineering "know-how"
- Broad production scope from first-class equipment
- Devotion to service and quality

Our new booklet, "Stampings", describes our plant, over 75 presses—also other equipment, and the range of our production. Please write for your copy and the name of our Stampings Sales Representative in your area.

Roof Rail for Semi-Trailer. Stock sheared to 56" length beforehand. Blank is formed and bent in one stroke. This operation utilizes the large bed area (48" x 72") and long stroke (10").

DETROIT STAMPING COMPANY

359 Midland Avenue Detroit 3, Michigan

Manufacturers of famous De-Sta-Co Toggle Clamps, Arbor Spacers, Shims, Shim Stock, Blower Housings, Refrigerator Compressor Valves.

. . . when machine-builders "buy the idea" of AMERICAN PHILLIPS SCREWS

PRODUCTION "PAYOFFS" climb up toward jackpot levels, where American Phillips Screws are policing costs in all assembly departments. Workers work faster and better. Shiny surfaces are never gouged. For American Phillips Screws and drivers are fumble-proof, skid-proof, slash-proof. And they can be handled *by anyone* with such ease and speed that time-savings average *50% over slotted screws.*

STEADY "PLAYS" are sure to be attracted by smartly styled machines, assembled with modern, attractive American Phillips Screws . . . the screws with the universal crossed recess. No burred heads to snag clothes. No loosening of screws under vibration and incessant use. And no matter what *you* make or vend, chances are you can profit *doubly,* too, through the production savings and merchandising power of American Phillips Screws. Write.

AMERICAN SCREW COMPANY, PROVIDENCE 1, R. I.

Chicago 11: 589 E. Illinois St. *Detroit 2:* 502 Stephenson Building

AMERICAN PHILLIPS *Screws*

ALL TYPES
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)

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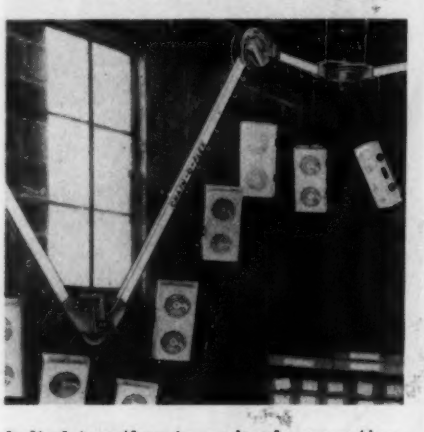
ity ratings. The above mentioned three trucks have capacities from 3000 to 5000 pounds.

Check No. 11 on Reply Card for more Details

Overhead Conveyor

Parts of the Chain-o-flex flexible chain conveyor made by Chain-O-Flex Corp., Franklin Park, Ill., are



bolted together in a simple operation. All corners are flexible and adjustable to any desired degree. The overhead conveyor is for use where a constant flow of material or assembled products is required.

Distributed by Industrial Equipment Co., 315 N. Ada St., Chicago 7, Ill., the conveyor's variable speeds are obtained by adjusting the band wheel on the drive unit which will provide a 3 to 1 speed ratio. Multiple drive units may be used on extremely long systems. Conveyor is of well guarded enclosed design throughout for safety.

Check No. 12 on Reply Card for more Details

Battery Charger

To service batteries of motorized hand lift trucks with the Chargette battery charger made by Electric Products Co., Cleveland 12, O., the truck operator plugs together the charging cable connector and turns the pointer on the charger to "normal charge" position. Automatically, the charging current begins at the proper value and is controlled throughout the charge at rates prescribed by the battery manufacturer. The charger stops in case of power failure and when power is restored, charging resumes. Unit shuts down completely when the battery is fully charged.

Weighing 115 pounds in its smallest rating, the charger occupies a floor area measuring 10⅝ x 14⅝ inches. Every part of a charger is readily accessible for inspection and maintenance. Unit is made in seven ratings to service lead-acid and Edison type batteries with from 6 to 18 cells.

Check No. 13 on Reply Card for more Details

Magnetic Separator

Magnetic and nonmagnetic material are separated at the discharge end of a portable, light-weight inclined belt type magnetic separator developed by Dings Magnetic Separator Co., 4247 W. McGeogh Ave., Milwaukee 14, Wis. The Alnico Perma-pulley

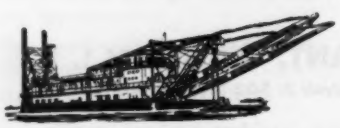
is weatherproof and magnetic permanence is said to equal the life of the separator.

Forward end of the motor driven conveyor is supported by a steel frame mounted on two wide-faced steel wheels designed to make the

STEEL

Giant Tuna Clippers built by Avondale

IS THE SECRET OF



Giant Dredges built by Avondale

SHIPBUILDING & REPAIRING

Avondale Marine Ways, INC.

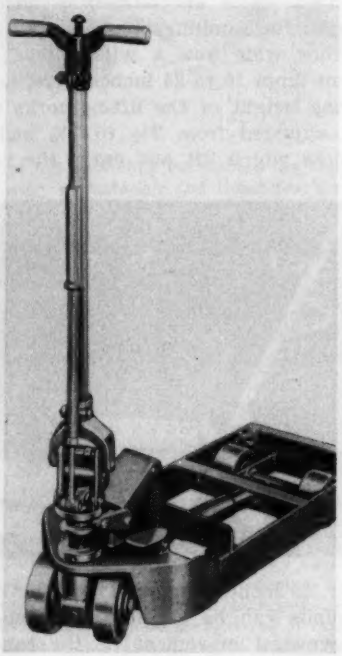
MAIN PLANT: AVONDALE, LA. QUICK REPAIR PLANT: HARVEY, LA.

unit easily portable over rough ground and sand. Lower end of the conveyor rests on the ground on a steel skid at a shoveling height of 24 inches. Standard separators are offered in lengths of 7 or 10 feet with belt widths of 12, 14, 16, 18, 20 or 24 inches. Capacities range from 40 to 80 tons of sand per day.

Check No. 14 on Reply Card for more Details

Mechanical Lift Truck

West Bend Equipment Corp., West Bend, Wis., is offering the Weldbilt single stroke mechanical lift truck, the handle of which swivels a full 360 degrees and is so designed that it applies maximum lifting force regardless of angle. This feature enables use in close quarters where the operator cannot swing the handle to the front position. An automatic anti-kickback handle release assures greater operating safety.



Widely spaced front wheels are mounted on an equalizer which serves to keep the platform level in spite of floor obstruction. A foot pedal releases the center holding latch for hydraulic shock-proof lowering. Both narrow and wide models of the new truck are offered in all standard sizes and heights, in capacities ranging from 1 ton to 2500 pounds.

Check No. 15 on Reply Card for more Details

Blocks, Cartridges

New flanged cartridges and pillow blocks offered by Boston Gear Works, Quincy, Mass., have spherically ground outside diameters which cut mounting time because their bearings align themselves on the shaft. Alloy

MATERIAL HANDLING *News*

Special metal containers, mounted on skids, holding approximately 5000 pounds of scrap are easily handled by a husky Clark Utilitruc. Fork-truck speed and versatility are particularly valuable in handling metals

No need of a pallet in handling big castings or other bulky units. There's practically no limit to the number of daily chores in a metals plant that can be performed quickly, safely and at remarkably low cost by Clark's 1000-lb. Truckloader

WRITE FOR *Material Handling News* —"must" reading.

TACKLE THOSE HANDLING COSTS! It is one of the surest ways to protect and increase profits, say Industry's wisest counsellors; and one of the few remaining opportunities for appreciable savings. The Clark Method expands the capacity of any business by speeding up the flow of material. It increases storage capacity without plant expansion. It minimizes demurrage and costly accidents. It is good common-sense—and now is the time—to CONSULT CLARK.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS AND INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIV., CLARK EQUIPMENT COMPANY BATTLE CREEK 26, MICH.
REPRESENTATIVES IN PRINCIPAL CITIES THROUGHOUT THE WORLD
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

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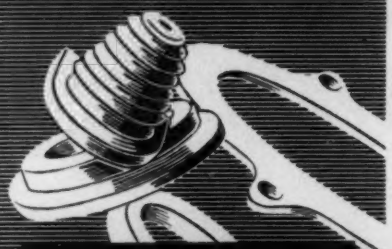
SILICONE
RUBBER PARTS



Developed especially for extreme high and low temperature applications, Silicone rubber retains rubber-like properties at temperatures ranging from -160° to +500° F. Parts fabricated from this versatile new synthetic are suitable for dielectric applications and are resistant to permanent compression, prolonged weathering, ozone, ultra-violet light, chlorinated hydrocarbons, lubricating oils, and many chemicals.

Silicone rubber parts are recommended for use in steam generators, gas cylinders, jet and reciprocating aircraft engines, electrical heating apparatus, electric motors, die casting machines, transformers, industrial ovens, and refrigeration and air conditioning equipment.

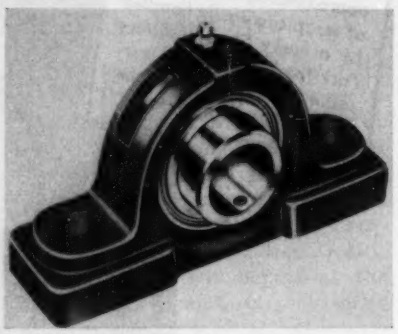
The Stalwart Rubber Company will fabricate Silicone rubber to meet your individual specifications. Modern engineering facilities and unerring production methods assure precision rubber parts.

Write for Catalog

STALWART
RUBBER COMPANY
5167 NORTHFIELD ROAD
BEDFORD, OHIO

steel ball bearing races and chrome alloy steel balls assure smooth running and long service life. Inner race is locked to shaft by two knurled cup-point set screws set at 120 degrees.

An oil resistant seal of labyrinth design provides dirt-free lubrication chamber. Seal is integral with bearing, permitting unrestricted misalign-

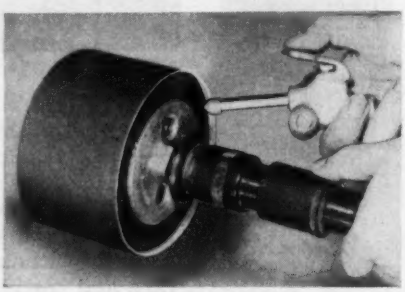


ment of bearing. The prelubricated bearing has an alemite fitting for easy regreasing. A rigid mounting is provided by a solid cast iron housing and slotted holes in the base make bolting down easy. Flanged cartridges and pillow blocks are available for shafts from ½ to 1¼ inches in diameter.

Check No. 16 on Reply Card for more Details

Pneumatic Grinder Head

Pneumatic rubber drum inflated at low pressures is the basis of the improved Nu-Matic grinder for grinding, sanding or polishing of curved, irregular and contour surfaces, made by Nu-Matic Grinders Inc., 10304 W. McNichols Rd., Detroit 21, Mich. The



unit, which can be used on bench, portable or flexible shaft motors, utilizes standard abrasive bands, 5 inches in diameter and 3½ inches wide in a variety of abrasive grits from 24 to 500. Band changes or replacements are accomplished by releasing the air and then reinflating the rubber drum.

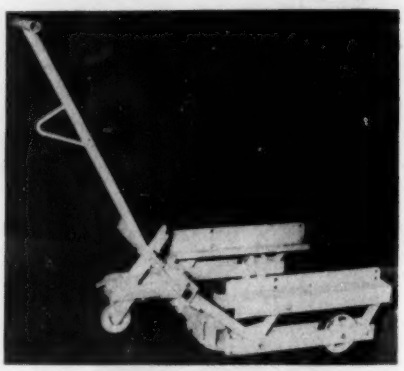
Drum provides a 100 per cent grinding surface of the entire width of the abrasive band. Varied revolutions per minute, adjustable drum compression and the use of varied grit abrasives give the unit flexibility and an almost unlimited variety of finishes. It is chatter-proof and weighs about 2 pounds.

Check No. 17 on Reply Card for more Details

Tote Pan Lift Truck

Adjustable in width and lowered height, the tote pan lift truck announced by Lyon-Raymond Corp., 1352 Madison St., Greene, N. Y., may be used with practically all standard tote pans ranging in width from 8 to 24 inches. Width of truck is adjusted by loosening eight set screws and contracting or expanding the telescopic frame as required. Lowered height is changed by raising or lowering the side plates which are fastened by four bolts.

Two styles are offered, a narrow model for handling pans from 8 to 16 inches wide and a wide model for pans from 16 to 24 inches wide. Lowering height of the lifting forks can be adjusted from 2½ to 7½ inches. Forks which lift and carry the pans



are 22 inches long and load to 1000 pounds can be elevated by a single downward movement of the towing handle. Forks automatically lock in the raised position and are released by a pedal.

Check No. 18 on Reply Card for more Details

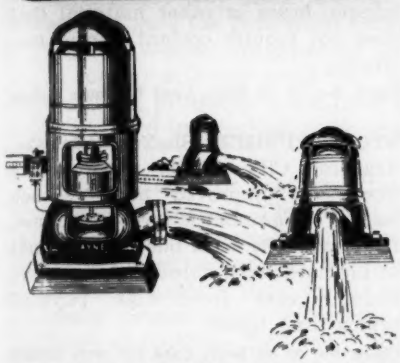
Locomotive Crane Clutch

American Hoist and Derrick Co., 63 S. Robert St., St. Paul 1, Minn., through the development of a new type outside band clutch, has solved the problem of keeping the clutch band perfectly round and enabling its full surface to contact the drum. This has been accomplished by using a double tandem clutch which consists of two half bands rather than one full band. Each half band is actuated by separate air cylinder, both being controlled by a single valve.

Clutch performs well under high speed operation with clamshell bucket or magnet or where extreme accucy is required in placing heavy loads. It is available as a replacement on many types of American

BIG OR LITTLE

They All Have the Same Layne Quality

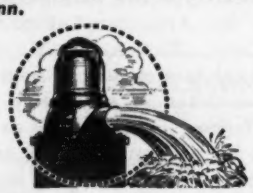


Layne has constantly maintained the highest quality of materials and finest precision manufacturing in all of their Well Water System installations. The smallest are just as substantial in construction and as high in efficiency of operation and always produce proportionately as much water as the biggest. This fact has been proven time and again to the complete satisfaction of hundreds of owners.

When Layne builds a Well Water System, more than fine casing, impellers, shafting, motors and skillful manufacturing are used. Layne's reputation extending back over nearly three quarters of a century as the world's most capable well water developers is included.

All Layne Well Water Systems are equipped with the famous high efficiency Layne Vertical Turbine Pumps. These pumps are designed and manufactured exclusively in Layne's own plant where every detail of their construction and assembling is under the supervision of engineers.

Write for catalogs and information about Layne's complete service which includes surveys, water strata explorations, pump installations, etc., for a complete Well Water System. Address LAYNE & BOWLER INC., General Offices, Memphis 8, Tenn.



LAYNE

WELL WATER SYSTEMS

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. ★ Layne-Atlantic Co., Norfolk, Va. ★ Layne-Central Co., Memphis, Tenn. ★ Layne-Northern Co., Mishawaka, Ind. ★ Layne-Louisiana Co., Lake Charles, La. ★ Louisiana Well Co., Monroe, La. ★ Layne-New York Co., New York City ★ Layne-Northwest Co., Milwaukee, Wis. ★ Layne-Ohio Co., Columbus, Ohio ★ Layne-Pacific, Inc., Seattle, Wash. ★ Layne-Texas Co., Houston, Texas ★ Layne-Western Co., Kansas City, Mo. ★ Layne-Minnesota Co., Minneapolis, Minn. ★ International Water Corporation, Pittsburgh, Pa. ★ International Water Supply, Ltd., London, Ont., Can. ★ Layne-Hispano Americana, S. A., Mexico, D. F.

locomotive cranes now in service and is offered on all new cranes built by the company.

Check No. 19 on Reply Card for more Details

Tensile Tester

Wire and similar specimens may have their load elongation measured with a new instrument based on electronic principles, made by Instron Engineering Corp., 2 Hancock St., Quincy 71, Mass. Full scale load range of the unit extends from 2 grams up to 5000 pounds in some models, representing a spread of

about one million to one and a choice of jaw speeds is incorporated ranging from 0.02 to 20 inches per minute.

Instrument utilizes an electronic weighing system based on the electric strain gage principle for detecting and recording the load applied to the sample under test. The main power to actuate the moving crosshead is derived from a servo-controlled drive. As almost no lag or error is introduced at reversal, this system enables measurements to be made of hysteresis under cyclic conditions with accurate correspondence between head position and chart travel being maintained at all times. Chart speeds ranging from 0.2 to 50 inches per minute provide magnification ratios up to 1000 to 1.

Check No. 20 on Reply Card for more Details

Metal Dryer

Optimus Equipment Co., 221 Water St., Matawan, N. J., is offering Spotless dryers designed to handle metal parts either on racks or monorail, on a continuous production basis. Machine provides spotless drying after plating or polishing and before subsequent plating or lacquering.

High velocity jet nozzles reduce

BRASS

PIPE • FITTINGS
SHEET • PLATE
ROD • BAR

COPPER

TUBING
ROD
SHEET

ALUMINUM

SHEET • TUBING
ANGLES • ROD
BAR • CHANNELS

LEVINSON
STEEL SALES CO.

32 PRIDE STREET • PITTSBURGH, PA.

LSS-1

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drying time to a minimum. These nozzles are directional and adjustable. Combinations of cold and hot air drying are employed. The cold blast removes water by mechanical action leaving a film which is removed by the following hot air blast. Fans, heating units and motors are all located within the framework and where overhead space permits, these units may be suspended from the ceiling.

Check No. 21 on Reply Card for more Details

• • •

ALTERNATORS: Kato Engineering Co., Mankato, Minn., have added a new series of alternators to their line. Series permits a top capacity of 300 kw at 1800 rpm, 60 cycles. It is available at speeds of 720, 900, 1200 and 1800 rpm.

Check No. 22 on Reply Card for more Details

TAKE-UP UNITS: Especially adaptable for conveyor construction, shaft adjustment and belt tightening devices, a new series of take-up units have been developed by Fafnir Bearing Co., New Britain, Conn. In shaft sizes ranging from ¾ to 2 7/16 inches, these type LTU units incorporate prelubricated, self-aligning Fafnir wide inner ring ball bearings.

Check No. 23 on Reply Card for more Details

PRESSURE SWITCH: For making or breaking an electrical connection when hydraulic fluid reaches a predetermined pressure, Saval Inc., Los Angeles 11, Calif., offers a new industrial pressure switch. It is available in six pressure ranges from 50 psi to 10,000 psi maximum, for water, oil or air service.

Check No. 24 on Reply Card for more Details

DISK SANDERS: Bradford Machine Tool Co., Cincinnati, O., offer 7-inch heavy duty and 9-inch standard duty portable electric disk sanders. Both are powered with a universal 110 v, ac or dc motor, which drives the tools at 5200 rpm, no load speed.

Check No. 25 on Reply Card for more Details

GEARED DIE STOCK: Leader No. 54, a geared receding die stock with a drive gear with a tensile strength of 40,000 to 60,000 psi is available from Oster Mfg. Co., Cleveland 3, O. Each tool is furnished with four individual sets of dies, each set having five individual and replaceable segments.

Check No. 26 on Reply Card for more Details

PLATE CLAMP: Nesco plate clamp, made by National Equipment & Supply Co. Inc., Newark 4, N. J., has rubber jaws to give a nonslip grip and to prevent marring or scratching material. Clamp sizes are available for handling plates up to 2½ inches in thickness and loads up to 2000 pounds.

Check No. 27 on Reply Card for more Details

OIL BURNERS: Oil burners offered by Peabody Engineering Corp., New York 19, N. Y., are available for both automatic and semiautomatic control. Units incorporate a complete system of fuel-oil pumping and oil preheating equipment, forced draft blower and wide range constant differential mechanical atomizing oil burner, all mounted on a compact steel base ready to be bolted to the boiler front.

Check No. 28 on Reply Card for more Details

LUBRICANT: A new product designed specifically for lubrication of industrial tableways has been developed by Beacon Laboratories of The Texas Co., New York, N. Y. Known as way lubricant D, it can be used on all kinds of ways—hardened steel, chilled cast iron or the new laminates. It is noncorrosive to steel and copper.

Check No. 29 on Reply Card for more Details

MOLD LUBRICANT: Bee Chemical Co., Chicago 33, Ill., offers Logolube, a liquid mold release. It does not interfere with painting and can be removed from plastic by wiping with a cloth wet with alcohol. It may be thinned for spraying on mold or may be applied by brush.

Check No. 30 on Reply Card for more Details

HYDRAULIC PUMP: A new type portable hydraulic pump for operating hydraulic jacks is offered by Layne-Northern Co., Mishawaka, Ind. It is a radial type rated at 1750 rpm and powered by a one cylinder air-cooled engine.

Check No. 31 on Reply Card for more Details

RELAY: A hermetically-sealed, direct current miniature relay developed by Struthers-Dunn Inc., Philadelphia 7, Pa., meets operating conditions of modern high-altitude and jet propelled aircraft. Known as type CX3554, it has SP DT contacts nominally rated at 2 amp and capable of withstanding inrushes of 12 amp at 26.5 v.

Check No. 32 on Reply Card for more Details

SWEEPER: Model 500 sweeper, offered by Wilshire Power Sweeper Co., Los Angeles 26, Calif., incorporates a vacuum attachment. The dust filter is of importance in ceramic, paper, enameling, storage, chemical, milling, packing and other plants where freedom from dust is essential. Machine features a one-piece aluminum frame, finger-tip dual control and an air-cooled gasoline motor.

Check No. 33 on Reply Card for more Details

JAWS: Gisholt Machine Co., Madison 10, Wis., has developed a new light weight plastic soft jaw blank. It is a molded phenolic type of plastic and can be machined to size with same feeds and speeds as used for brass. It is recommended for cast iron, aluminum, brass or other material that does not require coolant during machining.

Check No. 34 on Reply Card for more Details

STOCK PUSHER: Sheffer Collet Co., Traverse City, Mich., announces a new type improved master stock pusher for automatic screw machines. It is available with one piece inserts in file-hard steel, chrome plated steel, nodular cast iron, high physical bronze and nylon.

Check No. 35 on Reply Card for more Details

SOLDERING IRON: A new electric soldering iron for extra heavy soldering is offered by Hexacon Electric Co., Roselle Park, N. J. It is powered at 700 w with a replaceable 1¾-inch diameter screw type tip. It operates on any cycle, alternating or direct current, furnished for either 110 or 220 v and designated as model 700.

Check No. 36 on Reply Card for more Details

INSULATING VARNISH: Irvington Varnish & Insulator Co., Irvington 11, N. J. offers a newly developed internal curing insulating varnish for the impregnation of wound structures requiring maximum mechanical bonding strength. Known as Harvel 1012C, it can also be used as an all-purpose varnish.

Check No. 37 on Reply Card for more Details

FIRE EXTINGUISHER: A new dry chemical type fire extinguisher is offered by American-LaFrance-Foamite Corp., Elmira, N. Y. The dry chemical is a nontoxic, noncorrosive, nonconductor of electricity and will not freeze. Designated as No. 30 Alfco dry chemical, unit is recommended for flammable liquid and electrical fires.

Check No. 38 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

STEEL consumers are displaying increasing caution with respect to forward buying despite the fact their stocks are being gradually reduced, and, here and there, signs indicate a leveling out in the business decline which has been under way since last fall. Most trade observers look for continued sluggish demand over coming weeks, anticipating little improvement in order volume until the price situation is clarified, probably some time after a settlement is reached in pending wage negotiations.

PRICES—Major market attention currently is riveted on prices. The conviction is widespread downward adjustments are coming, this view being strengthened by comment of several steel industry leaders they would not be surprised if lower prices were effected before yearend. Steel executives, however, are not unanimous in this view. They point out that further rise in costs threatens and that currently earnings are tending downward. Most steel producers' first quarter earnings were off from the preceding three months though a number of them reported substantial increases. As of today it doesn't look as though an across-the-board revision in base quotations is in the cards. In fact, some observers think adjustments will be confined largely to extras. At present the leading producer is overhauling extras on a broad list of products, including flat-rolled items and bars, and it is expected other makers will take similar action. The new extra cards, first of which is expected momentarily, will include both increases and decreases and will reflect costs more closely in line with modern steel production practice. Within the past week or so Great Lakes Steel Corp., Weirton Steel Co. and Bethlehem Steel Co. revised extras on hot-rolled sheets to competitive levels.

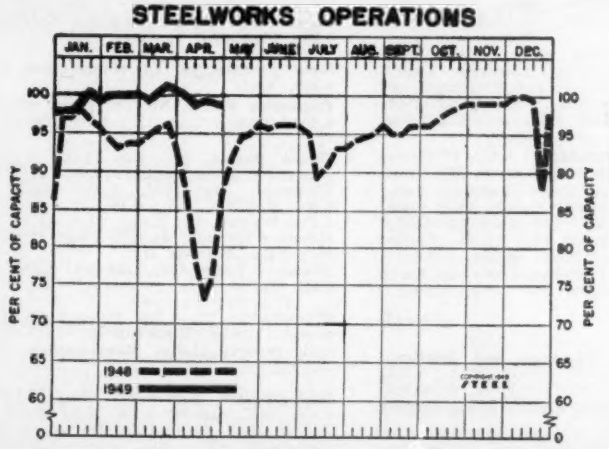
COMPOSITES—Scattered downward price adjustments continued to be noted last week. The outstanding change was a reduction of $7 per ton on cast iron pipe. Some adjustments also were effected on galvanized products, reflecting lower zinc prices. STEEL's price composite on semifinished steel declined to $66.72 from $69.02 and compared with $68.72 a year ago. The average on steelmaking scrap also was off at $23.25 compared with $23.42 the week preceding and $40.50 a year ago. In the trade the view now is held that scrap is nearing the bottom of its decline. The composite on finished steel held unchanged at $94.45 and compared with $81.14 last year, while the composite on steelmaking pig iron also held steady at $46.10 and compared with $39.18 a year ago.

FREIGHT ABSORPTION—Supreme Court's decision affirming the Federal Trade Commission's ban on basing point pricing in the sale of steel conduit has served to further confuse the steel pricing issue since the Court handed down no opinion on the questions involved. For all practical purposes it is believed this decision definitely removes the possibility of an early industry-wide return to freight absorption pending settlement of the problem through congressional action.

DEMAND—With supplies of steel steadily increasing, the tendency of buyers is to confine purchases as far as possible to immediate needs. Most mills now are able to make good deliveries on the great majority of products and some of them have capacity open for new tonnage for shipment in the current quarter. Mill consumer quotas, as such, are fast becoming a thing of the past with rationing no longer necessary. In some products fabricators and warehouses are having little difficulty in obtaining tonnage for delivery this quarter.

PRODUCTION—Steel mills continue to curtail operations gradually, the estimated national ingot rate declining 1 point further last week to 98 per cent of capacity. This represents a drop of 3½ points since mid-March.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity engaged in Leading Districts

	Week Ended April 30	Change	Same Week 1948	Same Week 1947
Pittsburgh	98	— 0.5	92.5	100.5
Chicago	99	— 2*	84	84
Eastern Pa.	93	None	81	91
Youngstown	105	None	75	91
Wheeling	92	— 3.5	80	89
Cleveland	101	+ 0.5	97	93
Buffalo	101.5	— 2.5	88	88.5
Birmingham	100	None	100	99
New England	77	— 3	81	95
Cincinnati	106	None	84	87
St. Louis	80	— 4.5	89	68.5
Detroit	108	— 3	101	92
Western	93.5	— 4	..	..
Estimated national rate	98	— 1	87	94

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 net tons for 1948; 1,749,928 tons for 1947. *Revised.

MARKETS SUMMARY MARKETS
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COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Apr. 30	Apr. 23	Month Ago Mar. 1949	Year Ago Apr. 1949	5 Years Ago Apr. 1944
Finished Steel	$94.45	$94.45	$97.17	$81.14	$56.73
Semifinished Steel	66.72	69.02	73.51	68.72	36.00
Steelmaking Pig Iron	46.10	46.10	46.22	39.21	23.00
Steelmaking Scrap	23.25	23.42	34.60	40.41	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

Mar. 1949	4.04073c
Feb. 1949	4.06149c
Jan. 1949	4.05394c
Mar. 1948	3.63079c
Mar. 1944	2.42750c

*** STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (re-rolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

† FINISHED STEEL WEIGHTED COMPOSITE: Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. March, 1949, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Apr. 30, 1949	Mar. 1949	Jan. 1949	Apr. 1948
Steel bars, Pittsburgh mills	3.35c	3.43c	3.45c	2.90c
Steel bars, del. Philadelphia	3.8164	3.8164	3.8094	3.356
Steel bars, Chicago mills	3.35	3.35	3.35	2.90
Shapes, Pittsburgh mills	3.25	3.27	3.275	2.80
Shapes, Chicago mills	3.25	3.25	3.25	2.80
Shapes, del. Philadelphia	3.4918	3.4918	3.4888	2.968
Plates, Pittsburgh mills	3.50	3.50	3.50	2.95
Plates, Chicago mills	3.40	3.40	3.40	2.95
Plates, del. Philadelphia	3.6348	3.7256	3.7217	3.19
Sheets, hot-rolled, Pittsburgh mills	3.25	3.275	3.275	2.80
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	3.95
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	2.80
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	3.55
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	3.95
Strip, hot-rolled, Pittsburgh mills	3.50	3.50	3.50	3.05
Strip, cold-rolled, Pittsburgh mills	4.375	4.375	4.375	3.80
Bright basic, wire, Pittsburgh	4.15	4.255	4.325	3.775
Wire nails, Pittsburgh mills	5.15	5.525	5.775	5.20
Tin plate, per base box, Pitts. dist.	$7.75†	$7.75†	$7.75†	$6.80

Semifinished

Sheet bars, mill	$67.00*	$67.00*	$67.00*	$60.00
Slabs, Chicago	52.00	52.00	52.00	45.00
Rerolling billets, Pittsburgh	52.00	56.20	59.00	45.00
Wire rod 5/32 to ¼-inch, Pitts. dist.	3.775c	3.775c	3.775c	3.175c

* Nominal. † 1.50 lb coating.

Pig Iron

	Apr. 30, 1949	Mar. 1949	Jan. 1949	Apr. 1948
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$40.996
Basic, Valley	46.00	46.00	46.00	39.00
Basic, eastern, del. Philadelphia	49.39	50.3002	50.2676	42.004
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	40.496
No. 2 fdry., del. Philadelphia	49.89	50.8002	50.7676	42.504
No. 2 foundry, Chicago	46.25	46.25	46.25	39.00
No. 2 foundry, Valley	46.50	46.50	46.50	39.50
Southern No. 2 Birmingham	43.38	43.38	43.38	37.88
Southern No. 2 del. Cincinnati	49.43	49.43	49.09	41.857
Malleable, Valley	46.50	46.50	46.50	39.50
Malleable, Chicago	46.50	46.50	46.50	39.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	55.00
Ferromanganese, f.o.b. Etna, Pa.	175.00	170.20	163.00	151.00*

* F.o.b. cars Pittsburgh.

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$24.00	$37.00	$41.90	$40.25
Heavy melt. steel, No. 2, E. Pa.	20.00	30.70	40.00	39.00
Heavy melt. steel, No. 1, Chicago	23.00	33.30	40.00	39.00
Heavy melt. steel, No. 1 Valley	22.00	35.85	39.75	40.25
Heavy melt. steel, No. 1 Cleveland	18.50	34.10	45.88	39.75
Heavy melt. steel, No. 1, Buffalo	23.50	35.95	45.88	43.00
Rails for rerolling, Chicago	27.75	43.85	59.38	49.50
No. 1 cast, Chicago	27.50	39.20	58.38	68.40

Coke

Connellsville, beehive furnace	$14.25	$14.50	$14.50	$12.55
Connellsville, beehive foundry	17.00	17.00	17.00	14.875
Chicago, oven foundry, ovens	20.40	20.40	20.40	19.25

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, open market, $80-$85 per gross ton. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mil, except: $57, Conshohocken, Pa.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $68, Conshohocken, Pa., mill.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $65, Conshohocken, Pa.

Sheet Bars: $67 nom., per net ton, mill; sales in open market $65-$75 per gross ton.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill; some sellers quoting up to $120 per gross ton.

Wire Rods: Basic and acid open-hearth, 7/32 & 5/16-inch, inclusive, 3.40c per lb, mill, except: 3.65c, Struthers, O.; 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Los Angeles; 4.15c Monessen, Pa. Basic open-hearth and bessemer, not resulphurized, 7/23 to 47/64-in., inclusive, 3.50c, mill.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.55c, Ecorse, Mich.; 4.00c Fontana, Calif.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif.; Portland, Oreg., Seattle; 4.20c, Kansas City, Mo.; 4.25c, Minnequa, Colo.; 4.40c, Atlanta.

Rail Steel Bars: (Base 10 tons): 3.35c Huntington, W. Va., and Moline, Ill.; 4.75c, Williamsport, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.36c, Plymouth, Mich.; 4.40c, Newark, N. J., Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.50c, Camden, N. J.; 5.30c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Struthers, O.; 5.40c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 4.05c, Pittsburg, Torrance, Calif.; 4.10c, Atlanta, Seattle, S. San Francisco, Los Angeles; 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 4.65c, Williamsport, Pa., mill; 3.35c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18 gage and heavier): 3.25c, mill, except: 3.45c, Ecorse, Mich.; 3.75c, Conshohocken, Pa.; 3.95c, Pittsburg, Torrance, Calif.; 4.15c, Fontana, Calif.; 6.25c, Kansas City, Mo.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 5.05c, Torrance Calif., Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich., Granite City, Ill.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill, except: 5.15c, Pittsburg, Torrance, Calif.; 5.30c, Kokomo, Ind.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Indiana Harbor, Ind.; 5.70c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill.; 5.45c, Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c, mill, except: 4.60c, Granite City, Ill.; 4.70c, Ecorse, Mich.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill, except: 5.95c, Warren. Electrical: Hot-rolled, 5.95c, mill, except: 6.05c, Kokomo, Ind.; 6.15c, Granite City, Ill.; 6.45c, Warren, O.; 6.55c, Niles, O. Motor: 6.70c mill, except: 6.90c, Granite City, Ill.; 7.20c, Warren, O. Dynamo: 7.50c, mill, except: 7.70c, Granite City, Ill.

Transformer 72, 8.05c, mill; 65, 8.60c, mill, except: 10.60c, Brackenridge, Pa.; 58, 9.30c, mill, except: 11.30c, Brackenridge, Pa.; 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.15c, Youngstown; 5.25c, Ecorse, Mich. Galvanized (No. 10), 6.75c, mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich.

Strip

Hot-Rolled Strip: 3.25c mill, except: 3.30c, Cleveland, Pittsburgh; 3.25-3.35c,* Sharon, Pa.; 3.45c, Ecorse, Mich.; 3.60c, Detroit; 3.65c, Atlanta; 3.70c, West Leechburg, Pa.; 4.00c, Pittsburg, Torrance, Calif.; 4.25c, Seattle, San Francisco, Los Angeles; 4.20c, Kansas City, Mo.; 4.30c, Minnequa, Colo.; 4.65c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

* Wider than 6-in. and 6-in. and narrower, respectively.

Cold-Rolled Strip (0.25 carbon and less): 4.00c, mill, except: 4.00-4.25c, Warren, O.; 4.00-4.50c, Youngstown; 4.15c, Riverdale, Ill.; 4.20c, Ecorse, Mich.; 4.40-4.50c, Detroit; 4.50c, New Haven, Conn., West Leechburg, New Castle, Pa., Boston; 4.75c, Dover, O., New Kensington, Pa.; 4.50-5.00c, Trenton, N. J.; 4.85c, Wallingford, Conn.; 5.75c, Los Angeles; 5.55c, Fontana, Calif. One company quotes 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base; another, 5.00c, Pittsburgh base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Dover, O., Chicago; 4.30c, Worcester, Mass.; 4.50c, New Castle, Pa., Boston, Youngstown; 4.75c, Wallingford, Conn. Over 0.40 to 0.60 C, 5.50c, mill, except: 5.65c, Chicago; 5.75c, Dover, O.; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston; 6.00c, New Castle, Pa. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.35c, Dover, O.; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton, N. J.; 6.60c, New Castle, Pa. Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J. Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.30c, Wallingford, Conn.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Struthers, O.; 5.25c, Ecorse, Mich., mill. Cold-rolled, 6.05c, mill, except: 6.25c, Youngstown; 6.35c, Ecorse, Mich., mill.

Tin, Terne, Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $7.50-$7.70; 1.50 lb coating $7.75-$7.95. Pittsburg, Calif., mill $8.25 and $8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb, 0.25 lb tin, $6.45-$6.65; 0.50 lb tin, $6.70-$6.90; 0.75 lb tin, $7.00-$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight $5.75-$5.85. Pittsburg, Calif., mill, $6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.40c, Sparrows Point, Md.; 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $6.65, except: $6.75 Fairfield, Ala., Sparrows Point, Md.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $15.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.40-3.60c, Cleveland; 3.45c, Sparrows Point, Md., Johnstown, Pa., Lackawanna, N. Y.; 3.50c, Coatesville, Pa.; 3.55c, Conshohocken, Pa.; 3.60c, Pittsburgh; 3.65c, Claymont, Del., Ecorse, Mich.; 4.30c, Seattle, Minnequa, Colo.; 4.56c, Houston; 5.30c, Fontana, Calif.; 4.95c, Harrisburg, Pa.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 4.50c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.30c, Conshohocken, Pa., Sparrows Point, Md., Johnstown, Pa.; 5.40c, Youngstown; 5.65c, Ecorse, Mich., Sharon, Pa.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 3.75c, Phoenixville, Pa.; 3.85c, Torrance, Calif.; 4.15c, Minnequa, Colo.; 4.30c, Seattle, S. San Francisco, Los Angeles; 3.80c, Fontana, Calif.

Alloy Structural Shapes: 4.05c, mill.
Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 5.15c, Struthers, O.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Mass.; 4.50c, Minnequa, Colo., Atlanta, Buffalo; 4.80c, Palmer, Mass.; 5.10c, Pittsburg, Calif.; 5.15c, S. San Francisco. One producer quotes 4.15c, Chicago base; another, 4.50c, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Basic MB Spring Wire, 5.55c, mill, except: 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., Williamsport, Pa., Portsmouth, O.; 5.50c, Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill, except: 4.90c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo.; 5.20c, Atlanta; 5.75c, S. San Francisco, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 5.20c. Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Galvanized (6 to 8 Gage base), 5.25c, mill, except: 5.35c, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 5.40c, Aliquippa; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 5.65c, Atlanta; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.65c, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 109, Worcester, Mass.; 110, Minnequa, Colo., Atlanta, Cleveland; 123, Pittsburg, Calif. One producer quotes Col. 103, Chicago and Pittsburgh base; another, Col. 113, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Portsmouth, O., Kokomo, Ind.; 116, Minnequa, Colo.; 121, Atlanta; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 114, Crawfordsville, Ind., freight equalized with Pittsburgh and Birmingham.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 126 Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 145, S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base.

Fence Posts (with clamps): Col. 114, Duluth; 115, Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $123.50 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 108, Sparrows Point, Md., Kokomo, Ind., Portsmouth, O.; 110, Atlanta; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 115, Crawfordsville, Ind., freight equalized with Birmingham and Pittsburgh.

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅝ and ¾ x 6-in. and shorter	37 off
¾-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

in packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	41 off	.....
1-in. and smaller	.....	38 off
1⅛-in.-1-in.	39 off	.....
1¼-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated)	
⅝ and smaller x 6 and shorter	40 off
¾, ⅞, & 1 x 6-in. and shorter	35 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
½-in. and under	48 off

Washers, Wrought

F.o.b. shipping point, to jobbers..Net to $1 off

For prices of stainless and tool steels please refer to Apr. 25 issue, page 139.

Tubular Goods

Standard Steel Pipe: Mill prices in carlots, threaded and coupled, to consumers about $200 a net ton. Discounts from base follow:

	Butt Weld Blk.	Gal.		Blk.	Gal.
In.			In.		
⅛	39½–	10–	1	46–	26½–
	41½	12½		48½	31½
¼	37½–	11–	1¼	46½–	27–
	39½	14½		49	32
⅜	34–	6–	1½	47–	27½–
	36	10½		49½	32½
½	40½–	19½–	2	47½–	28–
	43	24½		50	33
¾	43½–	23½–	2½, 3	48–	28½–
	46	28½		50½	33½
			3½ & 4	44½	27

	Lap Weld Blk.	Gal.	Elec. Weld Blk.	Gal.	Seamless Blk.	Gal.
In.						
2	40½	21	38½	19	28–	8½–
					38½	21
2½	44½	25	41½	22	33½–	14–
					41½	24
3	44½	25	41½	22	36–	16½–
					41½	24
3½&4	42½–	22–	43½	24	38½–	19–
	46½	27			43½	26
5 & 6	42½–	22–	43½	24	43½	23½–
	44½	27				26
7	....	....	....	....	43½	25

Line Steel Pipe: Mill prices in carlots to consumers about $200 a net ton.

	Butt Weld Blk.	Gal.		Butt Weld Blk.	Gal.
In.			In.		
⅛	40½	12½	1¼	46–	27½–
¼	38½	14½		48	31
⅜	35	9½	1½	46½–	28–
½	40–	20–		48½	31½
	42	23½	2	47–	28½–
¾	43–	24–		49	32
	45	27½	2½ & 3	47½–	29–
1	45½–	26–		49½	32½
	47½	30½	3½ & 4	43½	26

	Lap Weld Blk.	Gal.	Elec. Weld Blk.	Gal.	Seamless Blk.	Gal.
In.						
2	39½	20	37½	18	27–	7½–
					37½	20
2½	43½	24	40½	21	32½–	13–
					40	23
3	43½	24	40½	21	35–	15½–
					40½	23
3½-4	41½–	21½–	42½	23	37½–	18–
	45½	26			42½	25
5 & 6	41½–	21½–	42½	23	42½	22½–
	43½	26				25
8	45½	27	44½	23–	44½	23½–
				24		26
10	45	26½	44	22½–	44	23–
				24		25½
12	44	25½	43	22½	43	22–
						24½

Standard Wrought Iron Pipe: Mill price in carlots, threaded and coupled, to consumers about $200 a net ton.

	Butt Weld Blk.	Gal.		Lap Weld Blk.	Gal.
In.			In.		
⅜	+59½	+91	1¼	+22	+48½
½	+20½	+48	1½	+15½	+41
¾	+10½	+37	2	+ 7½	+32
1 and 1¼	+ 4½	+28	2½-3½	+ 5	+27½
1½	— 1½	+24½	4	List	+21½
2	— 2	+24	4½-8	+ 2	+23
			9-12	+12	+32½

Boiler Tubes: Net base c.l. prices, dollars per 100', mill; minimum wall thickness, cut lengths 4 to 24", inclusive.

O.D. B.W. Gauge	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	.....	13.39-14.64	13.00	13.00
1¼	13	.....	15.87-17.34	13.21	15.39
1½	13	16.45	17.71-19.35	14.60	17.18
1¾	13	18.71	20.15-22.02	16.60	19.54
2	13	20.96	22.56-24.66	18.60	21.89
2¼	13	23.36	25.16-27.50	20.73	24.40
2½	12	23.54-25.73	27.70-30.28	22.83	26.88
2½	12	25.79-28.19	30.33-33.15	25.02	29.41
2¾	12	27.33-29.87	32.14-35.13	26.51	31.18
3	12	28.68-31.35	33.76-36.90	27.82	32.74
3¼	11	33.39-36.50	39.29-42.95	32.39	38.11
3½	11	35.85-39.19	42.20-46.13	34.78	40.94
4	10	44.51-48.65	52.35-57.22	43.17	50.78
4½	9	58.99-64.47	69.42-75.88	....	....
5	9	68.28-74.64	80.35-87.82	....	....
6	7	104.82-114.57	123.33-134.81	....	....

Pipe Cast Iron: Class B, 6-in. and over, $93.50 per net ton, Birmingham; $106.70 del. Chicago; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb mill, except: $3.30, Minnequa, Colo.
Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.
Light (rail steel): $4.50 per 100 lb, Williamsport, Pa.; 3.55c, Huntington, W. Va.
Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.
Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.
Splice Bars: 4.25c, mill.
Standard Spikes: 5.35c, mill.
Axles: 5.20c, mill.

UNIVERSITY OF MICHIGAN LIBRARIES

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del.	....	52.634	53.134	....
Birmingham, furnace	42.88	43.38	....	....
Cincinnati, del.	....	49.43	....	....
Buffalo, furnace	46.00	46.50	47.00	....
Boston, del.	54.92	55.42	55.92	....
Rochester, del.	47.95	48.45	48.95	....
Syracuse, del.	49.39	49.89	50.39	....
§**Chicago,** district furnaces	46.00	46.00-46.50	46.50	47.00
Milwaukee, del.	47.82	47.82-48.32	48.32	48.82
Muskegon, Mich., del.	....	51.28-51.78	51.78	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.3002	48.8002	48.8002	49.3002
Lone Star, Tex., furnace	46.00	†46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
Duluth, furnace	....	46.50	46.50	47.00
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	52.50	53.00	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.0578	....	....
Portland, Oreg., del.	....	54.0578	....	....
Los Angeles, San Francisco	53.5578	54.0578	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	49.40	49.90	50.40	....
Ironton, Utah, furnace	47.00	47.50	....	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	....	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Struthers, O., furnace	46.00	....	....	....
Swedeland, Pa., furnace	48.00	48.50	49.00	49.50
Philadelphia, del.	49.39	49.89	50.39	50.89
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.8230	51.3230	....	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.1022	50.6022	50.6022	51.1022

† Low phosphorus southern grade.

‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaca; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.

§ Includes, in addition to Chicago, South Chicago, Ill., East Chicago, Gary and Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)..$59.50
6.51-7.00.. 60.50 9.01- 9.50. 65.50
7.01-7.50.. 61.50 9.51-10.00. 66.50
7.51-8.00.. 62.50 10.01-10.50. 67.50
8.01-8.50.. 63.50 10.51-11.00. 68.50
8.51-9.00.. 64.50 11.01-11.50. 69.50
F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Bessemer Ferrosilicon

Prices same as for blast furnace silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron Si 14.01-14.50%, $78.50 furnace, Niagara Falls; $84 open-hearth and $85 foundry grade, Keokuk, Iowa. Piglets, Si 16%, $91, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 a ton for 0.45% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphours. F.o.b. furnace, Lyles, Tenn....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54; Philadelphia, $56.9786 del. Intermediate phosphorus, Central furnace, Cleveland, $51.

Electrodes

(Threaded, with nipples, unboxed)

Inches Diam.	Length	Cents per lb, f.o.b. plant
Graphite		
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
8	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
Carbon		
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens	
Connellsville, furnace	$13.50-15.00
Connellsville, foundry	16.00-18.00
New River, foundry	16.50
Wise county, foundry	15.35
Wise county, furnace	14.60
Oven Foundry Coke	
Kearney, N. J., ovens	$22.00
Everett, Mass., ovens, New England, del.‡	22.70
Chicago, ovens	20.40
Chicago, del.	†21.85
Detroit, del.	24.16
Terre Haute, ovens	20.20
Milwaukee, ovens	21.15
Indianapolis, ovens	19.85
Chicago, del.	23.19
Cincinnati, del.	22.66
Detroit, del.	23.61
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.42
Cleveland, del.	22.55
Erie, del.	22.70
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens	20.40
Portsmouth, O., ovens	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del.	22.75
Flint, del.	22.98
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45. ‡ Or within $4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens (Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	20.50-26.50
Toluol, two degrees	23.00-26.50
Industrial xylol	20.50-26.50
Per ton bulk, ovens	
Sulphate of ammonia	$45.00
Per pound, ovens (Effective as of Oct. 1)	
Phenol, 40 (carlots, returnable drums)	13.50
Do., less than carlots	14.25
Do., tank cars	12.50
(Effective as of Oct. 25)	
Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermedinte-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill, Station, Clearfield, Pa.; Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting., Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibonsburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural)

Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56.62% concentrates, contract 16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68% .. 17.00
Brazil iron ore, 68-69% 19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid $26-$28

Manganese Ore

Long term contracts, involving large tonnages, prices are nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. United States ports; prices on lower grades adjusted to manganese content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African

48% 2.8:1	37.50
48% 3:1	39.00
48% no ratio	31.00

South African (Transvaal)

44% no ratio	$25.50-$26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50

Brazilian—nominal

44% 2.5:1 lump	$33.65

Rhodesian

45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00

Domestic (seller's nearest rail)

48% 3:1	$39.00

Molybdenum

Sulphide conc., lb, Mo., cont., Mines $0.90

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS			STRIP		BARS				PLATES	
	H-R 10 Ga.	C-R 17 Ga.	Gal. *10 Ga.	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½" & up	H-R Alloy **4140	Standard Structural Shapes	Carbon ⅜"-¾"	Floor ¾" & Thicker
New York (city)	6.00	6.51‡	7.20	5.82	...	5.77	6.56	8.68	5.53	5.90	7.36
New York(c'try)	5.80	6.31‡	7.00	5.62	...	5.57	6.36	8.48	5.33	5.70	7.16
Boston (city) ..	6.10	6.70	7.21	5.80	...	5.67	6.42	8.72	5.57	5.95	7.40
Boston (c'try)..	5.95	6.55	7.06	5.65	...	5.52	6.27	8.57	5.42	5.80	7.25
Phila. (city)...	5.72	6.64	7.33	5.60	...	5.55	6.34	8.40	5.25	5.53	6.74
Phila. (c'try)...	5.57	6.59	7.18	5.45	...	5.40	6.19	8.25	5.10	5.38	6.59
Balt. (city) ...	5.46†	6.36	7.26	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)...	5.31†	6.21	7.11	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse) .	5.84-6.00	...	...	5.90	...	5.91-5.95	6.61	...	5.85-5.89	6.05-6.09	7.50-7.54
Buffalo (del.)..	5.00	6.05	7.85	5.49	6.50	5.20	6.05	10.13	5.25	5.50	7.06
Buffalo (w'hse)	4.85	5.90	7.70	5.34	6.35	5.05	5.90	9.98	5.10	5.35	6.91
Pitts. (w'hse)..	4.90§	5.75§	6.95	5.10	6.00	4.90	5.65	9.60	4.90	5.05-5.10	6.55
Detroit (w'hse).	5.42§	6.22§†	7.53	5.42	6.42-6.73	5.48	6.15	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00†	5.90‡	6.80-6.96	5.15-5.18	6.15	5.15-5.16	5.85	8.24-8.40	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse).	4.85†	5.75‡	6.65-6.81	5.00-5.03	6.00	5.00-5.01	5.70	8.24-8.25	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.26	5.94	6.98	5.38	6.10	5.43	6.18	...	5.43	5.63	7.03
Chicago (city).	5.20	5.90§‡	7.10-7.15	5.00	6.67-6.83	5.05	5.85	8.25[9]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05	5.75§‡	6.95-7.00	4.85	6.52-6.68	4.90	5.70	8.10[9]	4.90	5.10	6.55
Milwaukee(city)	5.38	6.08§‡	7.28-7.33	5.18	6.82-7.01	5.23	6.03	8.43[9]	5.23	5.43	6.88
St. Louis (del.)	5.34§	6.24§	7.44	5.34	6.64	5.39	6.19[12]	6.64	5.39	5.59	7.04
St. L. (w'hse).	5.19§	6.09§	7.29	5.19	6.49	5.24	6.04[12]	9.49	5.24	5.44	6.89
Birm'ham (city)	5.20§	...	6.60	5.20	...	5.15	6.66-6.83	...	5.15	5.40	7.41-7.73[20]
Birm'ham(c'try)	5.05§	...	6.45	5.05	...	5.00	6.51-6.68	...	5.00	5.25	7.26-7.58[20]
Omaha, Nebr...	6.13	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60§	8.05	8.20†	6.80	9.50	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse) .	6.45§	7.90	8.05†	6.65	9.35	6.10	8.05	...	5.95	6.15	8.05
San Francisco..	6.15[21]	7.50	8.10	6.75[21]	8.25[18]	5.90[21]	7.55	10.85[3]	5.90	6.35	8.10
Seattle-Tacoma.	6.35[17]	7.90[5]	8.25	6.70[17]	...	6.20[17]	8.15[1]	9.45[3]	6.30[17]	6.35[17]	8.40[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [2]—1000 to 4999 lb; [5]—450 to 1499 lb; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [12]—1000 lb and over; [17]—300 to 999 lb; [18]—1500 to 1999 lb; [20]—400 to 3999 lb; [21]—400 lb and over; [22]—500 to 1499 lb.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † base price, does not include gage extras; ‡ 15 gage; § 18 gage and heavier; ** as rolled; †† add 0.40 for sizes not rolled in Birmingham; ‡‡ top level of quoted range is nominal.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P. 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c, Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max, 0.03% C 31.85c per lb of contained Cr, 0.04% C 29-75c, 0.06% C 28.75c, 0.10% C 28.25c- 28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium. ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si; packed 19.90-21.70c; ton lots 21.00-22.60c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.) C.l., lump, bulk, regular 18.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 8.15c per lb of alloy, ton lots packed 9.55c, 200 to 1999 lb 9.90c, smaller lots 10.40c, Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr.). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

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UNIVERSITY OF MICHIGAN LIBRARIES

Zinc Drops to 12.50-Cent Level

Fifth decline since mid-March brings market to level five cents under postwar high. Several mines and mills close in Tri-State district. Copper product prices off

New York—Primary zinc prices dropped ½-cent further last week to the basis of 12.50c, East St. Louis, for prime western. This is the fifth drop in the price of zinc since Mar. 22 and a total decline of 5 cents from the postwar high that prevailed from November up to late March of this year.

With electrolytic copper freely available at 20.00c, delivered Connecticut Valley, brass mill product and wire mills lowered their prices to that basis. Brass and bronze ingot makers lowered their prices 1½ to 2 cents a pound to a level that prevailed when copper was selling at 14.37½c a pound.

Roger W. Straus, chairman of the American Smelting & Refining Co., told stockholders at their annual meeting last week that he would not venture to guess what the future will hold for copper, lead and zinc prices. "I do not think, however, that these metal prices will get back to prewar levels because of sharply increased production and other costs," he added. "Lead and zinc costs currently are 2½ to 3 times those prevailing in 1939 while the estimated overall copper production costs are up about 50 to 100 per cent.

"With inventories being depleted, a revised demand for copper should take place late in May or June for shipment during August and September," he said.

Mr. Straus predicted that demand for lead, which has shown some pick-up should improve further in May for June delivery. He also forecast an improvement in zinc buying next month for June shipment.

The die casting industry is buying less zinc. Galvanizers also are buying less zinc while using up inventory, although their operations are continuing at a high rate. Brass mill business has been curtailed sharply.

Copper—Copper sales at the custom smelter price of 20.00c are very small, Mr. Straus told stockholders. "Last year there was a terrific scramble to get copper, and large supplies are acquired by makers of copper goods," he continued. "The result has been that when the ultimate consumer started to slow up demand, the supply of metal on hand became much larger than had been previously realized."

Calumet & Hecla Consolidated Copper Co. has reduced its operations to the basis of four days a week. Operations previously were on a five-day a week basis.

Zinc—Prior to the latest decline in zinc, closing down of 13 mines and nine mills in the Tri-State mining district was reported, affecting 500 workers. At that time, it was said that another drop of 1-cent a pound would result in laying off an additional 1000 men. The cutback in mine and mill operations represents curtailment of output so far of about 15 per cent of the combined facilities in the area. Some of the mines and mills still in operation are reducing wages $1 to $1.50 per day.

Lead—Undertone of the domestic lead market was slightly firmer last week at 14.80c to 14.85c, St. Louis, for the common grade as consumers showed interest in re-entering the market. Shipments of refined lead to domestic consumers declined 9475 tons in March to 33,368 tons, according to the American Bureau of Metal Statistics. Total shipments in the first quarter amounted to 128,360 tons, or about 24,000 tons less than the like period a year ago. Production increased to 53,947 tons in March from 44,751 tons in the preceding month, bringing total output for the first quarter to 149,362 tons compared with 144,512 tons in the like period in 1948. Total stocks of lead at refineries rose to 56,737 tons as of Mar. 31 from 38,514 tons as of Feb. 28.

"The return to a more realistic price basis for lead is generally beneficial and should cause no uneasiness as to the future," Joseph A. Martino, president, National Lead Co., told stockholders at their annual meeting in Sayreville, N. J. "Our inventories have been kept well in hand, and reserves are sufficient to offset practically all of the price decline.

"Metal prices are obviously at a much healthier level now than during 1948. Once consumers feel satisfied that prices have found a stable level, we expect to see a return to normal buying, perhaps with a slight bulge to make up for the recent suspension of purchases in some lines.

"For the remainder of 1949 we may reasonably expect considerable variation in trends of business in the different industries we serve," concluded Mr. Martino. "On the whole, however, we expect 1949 to be a good year for National Lead Co."

Tin—Combined Tin Committee has allocated an additional 17,150 tons of pig tin for the first half of 1949, of which the United States receives 13,250 tons. This makes total allocations for that period 61,475 tons as against 39,566 tons for the like 1948 period. United States allocations for the first half total 37,500 tons against 20,400 tons in the like period a year ago.

Nickel Output Gains in 1948

New York—World sales of nickel in all forms in 1948 by International Nickel Co. of Canada Ltd. were 240,098,274 pounds compared with 205,278,868 pounds in 1947, Robert C. Stanley, chairman of the board of directors, told shareholders at the annual meeting held here last week. Although demand for the metal in 1948 put pressure on the immediate supply available, it is believed the supply met actual consumption needs, he said.

The company's plant at Port Colborne, Canada, for the recovery of cobalt is now producing about 15 tons of metal in oxide monthly and an increase in output of this element is contemplated.

"In Canada, Great Britain and the United States, the production of alloy engineering steels was maintained at high levels throughout the year," Mr. Stanley said. "The total for the three countries was approximately 9 million ingot tons, of which it is estimated around 40 per cent contained nickel." Total volume of stainless steel ingot production in these countries was about 700,000 ingot tons in 1948, an all-time peak.

Sales of nickel for plating increased, he said, attaining a rate two and one-half times higher than prewar. The importance of the cast iron industry as a market for nickel has been recognized for many years and the use of nickel in this field has made steady progress.

Estimating capital expenditures in 1949 at about $18 million, Mr. Stanley stated that "in the last 20 years the company's capital expenditures have totaled $154 million. . . . During the 20 years the property account, before reserves, has risen from $76,272,530 to $276,440,111. . . . The postwar expansion program of our Development and Research Division is nearing completion."

Permanente To Cut Output

Spokane, Wash.—Permanente Metals Corp. announces about 300 employees of a total of 2300 at the Trentwood plant will be laid off May 1 because of a recession in business.

Detinning Operations Gain

Washington—Secondary tin recoverd by detinning plants, as metal and in chemical compounds, increased 6 per cent in 1948, according to the Bureau of Mines. Recovery of tin from tin-plate clippings and old cans was 3667 short tons in 1948 compared with 3447 tons in 1947.

The tonnage of tin-plate clippings treated in 1948 was the largest of record. The industry treated 376,320 long tons of tin-plate clippings in 1948—17 per cent more than in 1947, and exceeding by 10 per cent the previous peak of 341,075 tons used in 1941. Old cans processed decreased 10 per cent to only 15,079 long tons in 1948 compared with 16,741 tons in 1947, and a record use of 175,870 tons in 1943. Tin recovered from tin-plate clippings was 3561 tons in 1948 an increase of 7 per cent, while that from old cans was 106 tons (mostly in the form of pig tin), a decline of 21 per cent.

Reynolds Cuts Cable Prices

Louisville, Ky. — A substantial slash in price of aluminum cable for rural electrification has been announced by Reynolds Metals Co. The reduced prices will be effective on all orders accepted for delivery after Jan. 1, 1950, according to David P. Reynolds, vice president and sales manager of the Aluminum Division.

The cut in cable prices ranges from $1.63 up to $4.06 per hundred weight. The new prices also include the ½-cent a pound commission which is paid Wisconsin Electric for its services in serving as the distributor.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic, 20.00, Conn. Valley; Lake, Nom., Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 15.75-17.00c; 88-10-2 (No. 215) 25.50c; 80-10-10 (No. 305) 21.75c; No. 1 yellow (No. 405) 13.50-14.50c.

Zinc: Prime western 12.50, brass special 12.75c, intermediate 13.00c, East St. Louis; high grade 13.50c, delivered.

Lead: Common 14.80-14.85c; chemical, 14.90c; corroding 14.90-14.95c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloy (6-6 type) 17.25-17.50; No. 12 foundry alloy (No. 2 grade) 16.50-17.00; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 17.00c; grade 2, 16.00c; grade 3, 15.00c; grade 4, 14.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $85-$88 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.
Silver: Open market, New York, 71.50c per ounce.

Platinum: $72-$75 per ounce.

Palladium: $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill)

Sheet: Copper 33.68; yellow brass 30.77; commercial bronze, 95%, 33.68; 90%, 33.28; red brass, 85%, 32.36; 80%, 31.97; best quality, 31.56; nickel silver, 18%, 43.85; phosphor-bronze, grade A, 5%, 52.72.

Rods: Copper, hot rolled 29.53; cold drawn 30.78; yellow brass, free cutting, 25.32; commercial bronze, 95% 33.37; 90% 32.97; red brass 85% 32.05; 80% 31.66.

Seamless Tubing: Copper 33.72; yellow brass 33.78; commercial bronze 90% 35.94; red brass 85% 35.27; 80% 34.88.

Wire: Yellow brass 31.06; commercial bronze, 95% 33.97; 90% 33.57; red brass, 85% 32.65; 80% 33.26; best quality brass 31.85.

Copper Wire: Bare soft, f.o.b. eastern mills, c.l. 25.92½c, l.c.l. 26.42½c; weatherproof, f.o.b. eastern mills, c.l. 27.22c, l.c.l. 27.72½c; magnet, delivered, c.l. 30.00, 15,000 lb or more 30.25c, l.c.l. 30.75c.

ALUMINUM

Sheets and Circles: 2s and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12-24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $20.00 per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $20.00 per cwt; cut coils, $20.00. Traps and Bends: List price plus 53%.

ZINC

Sheets, 17.00c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 16.25c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 15.25c; over 12-in., 16.25c.

NICKEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill.)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c, Seamless tubes, 80.00c, Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00c; 100 lb to 4000 lb, 35.00-36.00c.

DAILY PRICE RECORD

	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Mar. Ave.	23.486	18.825	17.056	103.00	17.00	38.50	40.00	71.50
Apr. 1-2..	23.25-23.50	15.85-16.80	16.00	103.00	17.00	38.00	40.00	71.50
Apr. 4 ...	23.25-23.50	15.80-15.85	16.00	103.00	17.00	38.50	40.00	71.50
Apr. 5 ...	23.25-23.50	15.80-15.85	15.00	103.00	17.00	38.50	40.00	71.50
Apr. 6-13.	23.25-23.50	14.80-14.85	15.00	103.00	17.00	38.50	40.00	71.50
Apr. 14-18	21.50	14.80-14.85	14.00	103.00	17.00	38.50	40.00	71.50
Apr. 19-20	21.50	14.80-14.85	13.00	103.00	17.00	38.50	40.00	71.50
Apr. 21-27	20.00	14.80-14.85	13.00	103.00	17.00	38.50	40.00	71.50
Apr. 28 ..	20.00	14.80-14.85	12.50	103.00	17.00	38.50	40.00	71.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery, unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9%, flake, f.o.b. Philadelphia, carloads, 26.00c; 5 tons and over 26.50c; 1 to 5 tons, 27.00c; less than 1 ton, 27.50c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat untrimmed 31.84c; oval 31.34; cast 29.87c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 48.00c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,900 lb, 17.00c, f.o.b. Niagara Falls, N. Y.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 26.25c; over 250 lb, 25.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland. Add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 200 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25c; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 42.50c, f.o.b. Cleveland; 43.00c, Detroit; 42.00c, f.o.b. Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 97.00c; in 100 lb kegs, 98.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	17.625	17.625	16.875
Yellow brass	15.000	14.750	14.250
Commercial Bronze			
95%	16.625	16.375	15.875
90%	16.375	16.125	15.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, f.o.b. shipping point, carload lots)

No. 1 copper 13.50, No. 2 copper 12.50, light copper 11.50, composition red brass 10.00-10.50, auto radiators 8.00, heavy yellow brass 7.50-7.75.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.50, No. 2 copper 12.50, light copper 11.50, refinery brass (60% copper), per dry copper content 11.50.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire No. 1 12.25-12.50, No. 2 11.25-11.50, light copper 10.25-10.50, No. 1 composition red brass 8.50-8.75, No. 1 composition turnings 8.00-8.25, mixed brass turnings 6.50-6.75, new brass clippings 11.50-11.75; No. 1 brass rod turnings 7.50-7.75, light brass 5.50-5.75, heavy yellow brass 6.50-6.75, new brass rod ends 8.50-8.75, auto radiators, unsweated 6.75-7.00, cocks and faucets 7.50-7.75, brass pipe 7.75-8.00.

Lead: Heavy 8.00-8.50, battery plates 4.25-4.50, linotype and stereotype 10.50-11.00, electrotype 8.50-9.00, mixed babbitt 11.50-12.00, solder joints, 12.50-13.00.

Zinc: Old zinc 5.00-5.50, new die cast scrap 5.00-5.50, old die cast scrap 3.00-3.50.

Tin: No. 1 pewter 56.00-58.00, block tin pipe 78.00-80.00, No. 1 babbitt 43.00-45.00, siphon tops 47.00-49.00.

Aluminum: Clippings 2S 10.00-10.50, old sheets 6.50-7.00, crankcase 6.50-7.00, borings and turnings 3.50, pistons, free of struts, 6.50-7.00.

UNIVERSITY OF MICHIGAN LIBRARIES

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt	$24.00
No. 2 Heavy Melt	22.00†
No. 1 Busheling	24.00
No. 1 Bundles	24.00
No. 2 Bundles	20.00-21.00
No. 3 Bundles	19.00-20.00
Heavy Turnings	18.00-19.00
Machine Shop Turnings	14.50-15.50‡
Mixed Borings, Turnings	14.50-15.50‡
Short Shovel Turnings	18.00-18.50
Cast Iron Borings	18.50-19.50
Bar Crops and Plate	25.50-26.00
Low Phos. Steel	25.50-26.00

Cast Iron Grades†

No. 1 Cupola Cast	25.00-26.00
No. 1 Machinery Cast	30.00-31.00
Charging Box Cast	25.50-26.50
Heavy Breakable Cast	24.00-25.00
Brake Shoe	25.00-26.00

Railroad Scrap

No. 1 R.R. Heavy Melt	25.00-25.50
Axles	33.00-34.00
Rails, Random Lengths	28.00-29.00*
Rails, 2 ft and under	33.00-34.00
Rails, 18 in. and under	35.00-36.00
Railroad Specialties	30.00-31.00
Angles, Splice Bars	35.00-36.00

*Brokers' buying prices.
†Nominal.
‡Crushers buying prices.

CLEVELAND

Heavy Melt. Steel	$18.00-19.00†
No. 1 Busheling	18.00-19.00†
No. 2 Bundles	16.00-17.00†
Machine Shop Turnings	12.00†
Mixed Borings, Turnings	16.00-17.00†
Short Shovel Turnings	16.00-17.00†
Cast Iron Borings	16.00-17.00†
Bar Crops and Plate	22.00†
Punchings & Plate Scrap	22.00†
Cut Structurals	23.00†

Cast Iron Grades†

No. 1 Cupola	29.00-30.00
Charging Box Cast	27.00-28.00
Stove Plate	25.00-27.00
Heavy Breakable Cast	21.00-22.00
Unstripped Motor Blocks	21.00-22.00
Malleable	23.00-24.00
Brake Shoes	22.00-22.50
Clean Auto Cast	33.00-33.50
No. 1 Wheels	27.00-28.00
Burnt Cast	20.00-21.00

Railroad Scrap

No. 1 R.R. Heavy Melt	25.00-26.00
R.R. Malleable	23.00-24.00†
Rails, 3 ft and under	37.00-38.00
Rails, Random Lengths	30.00-32.00
Cast Steel	28.00
Railroad Specialties	28.00
Uncut Tires	24.00
Angles, Splice Bars	30.00-31.00

† Nominal.

VALLEY

Heavy Melt. Steel	$22.00†
No. 1 Bundles	22.00†
No. 2 Bundles	19.00†
Machine Shop Turnings	13.50-14.00†
Short Shovel Turnings	18.00-18.50†
Cast Iron Borings	18.00-18.50†
Low Phos.	25.00-26.00†

Railroad Scrap

No. 1 R.R. Heavy Melt	26.00-27.00

† Nominal.

MANSFIELD

Machine Shop Turnings	$13.50-14.00†
Short Shovel Turnings	18.00-18.50†

† Nominal.

CINCINNATI

No. 1 Heavy Melt. Steel	$21.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	18.00
Machine Shop Turnings	10.00
Mixed Borings, Turnings	10.00
Short Shovel Turnings	10.00
Cast Iron Borings	11.00

Cast Iron Grades

No. 1 Cupola Cast	29.00
Charging Box Cast	23.00
Heavy Breakable Cast	22.00
Stove Plate	17.00
Unstripped Motor Blocks	16.00
Brake Shoes	17.00
Clean Auto Cast	29.00
Drop Broken Cast	32.00

Railroad Scrap

No. 1 R.R. Heavy Melt	21.00
R.R. Malleable	21.00
Rails, Rerolling	28.00
Rails, Random Lengths	24.00
Rails, 18 in. and under	34.50

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 1 Bundles	$17.00-18.00
No. 2 Bundles	15.00-16.00
No. 2 Heavy Melt. Steel	16.00-17.00
No. 1 Busheling	16.00-17.00
Machine Shop Turnings	11.00-12.00
Mixed Borings, Turnings	12.00-13.00
Short Shovel Turnings	13.00-14.00
Cast Iron Borings	13.00-14.00
Punchings & Plate Scrap	17.00-18.00

Cast Iron Grades

No. 1 Cupola Cast	22.00-24.00
Heavy Breakable Cast	17.00-19.00
Clean Auto Cast	22.00-24.00

BUFFALO

No. 1 Heavy Melt. Steel	$23.00-24.00
No. 2 Heavy Melt. Steel	20.00-21.00
No. 1 Bundles	20.50-21.00
No. 2 Bundles	20.00-21.00
No. 1 Bushelings	20.00-21.00
Machine Shop Turnings	14.00-15.00
Mixed Borings, Turnings	17.00-17.50
Cast Iron Borings	17.00-17.50
Short Shovel Turnings	18.00-18.50
Low Phos.	24.50-25.50

Cast Iron Grades

Mixed Yard Cast	28.00-29.00
Heavy Breakable	26.00-27.00
Malleable	31.00-32.00
Clean Auto Cast	32.00-33.00

Railroad Scrap

Rails 3 ft. and under	33.00-34.00
Scrap Rails	28.00-29.00
Specialties	29.50-30.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	$22.50-23.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
No. 1 Bundles	22.50-23.00
No. 2 Bundles	18.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	14.00
Short Shovel Turnings	17.00-18.00
Bar Crop and Plate	27.00
Punchings & Plate Scrap	27.00
Cut Structurals	25.00
Elec. Furnace Bundles	22.50-23.00
Heavy Turnings	22.50-23.00
No. 1 Chemical Borings	Nom.

Cast Iron Grades

No. 1 Cupola Cast	27.00
No. 1 Machinery Cast	29.00-30.00
Charging Box Cast	27.00-28.00
Heavy Breakable Cast	27.00-28.00
Unstripped Motor Blocks	24.50
Clean Auto Cast	29.00-30.00
No. 1 Wheels	29.00-30.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$16.00-17.00
No. 2 Heavy Melt. Steel	14.00-14.50
No. 1 Busheling	14.00-14.50
No. 1 Bundles	16.00-17.00
No. 2 Bundles	14.50
No. 3 Bundles	nominal
Machine Shop Turnings	5.00-7.00
Mixed Borings, Turnings	5.00-7.00
Short Shovel Turnings	8.00-9.00
Punchings & Plate Scrap	16.50-17.50
Cut Structurals	nominal
Elec. Furnace Bundles	16.50-17.50

Cast Iron Grades

No. 1 Cupola Cast	20.00-21.00
No. 1 Machinery	21.00-22.00
Charging Box Cast	18.00-18.50
Heavy Breakable	18.00-18.50
Unstripped Motor Blocks	nom.
Malleable	nom.

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$16.00-17.00
No. 2 Heavy Melt. Steel	12.50-13.50
No. 1 Bundles	15.00-15.50
No. 1 Busheling	11.00-12.00
Machine Shop Turnings	7.00-8.00
Mixed Borings, Turnings	7.00-8.00
Short Shovel Turnings	10.00-11.00
Bar Crops and Plate	18.00-19.00
Punchings & Plate Scrap	18.00-19.00
Chemical Borings	12.00-13.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-26.00
Mixed Cast	22.00-24.00
Heavy Breakable Cast	18.00-19.00
Stove Plate	22.00-24.00
Unstripped Motor Blocks	18.00-20.00

CHICAGO

No. 1 Heavy Melt. Steel	$22.00-24.00†
No. 2 Heavy Melt. Steel	19.00-22.00
No. 1 Bundles	22.00-23.00
No. 2 Bundles	18.00-20.00
No. 3 Bundles	17.00-18.00*
Machine Shop Turnings	12.00-13.00
Mixed Borings, Turnings	12.00-13.00
Short Shovel Turnings	14.00-15.00
Cast Iron Borings	12.00-13.00
Bar Crops and Plate	23.00-24.00
Punchings	23.00-24.00
Elec. Furnace Bundles	22.00-23.00
Heavy Turnings	20.00-21.00
Cut Structurals	23.00-24.00

Cast Iron Grades*

No. 1 Cupola Cast	27.00-28.00
Clean Auto Cast	27.00-28.00
No. 1 Wheels	27.00-28.00

Railroad Scrap

No. 1 R.R. Heavy Melt	22.00-24.00†
Malleable	24.00-25.00*
Rails, Rerolling	27.50-28.00
Rails, Random Length	23.00-24.00
Rails, 2 ft. and under	28.00-29.00
Rails, 18 in. and under	29.00-30.00
Railroad Specialties	26.00-27.00
Angles, Splice Bars	26.00-27.00

* Nominal. † Allocated material.

ST. LOUIS

No. 1 Heavy Melt. Steel	$22.00-23.00
No. 2 Heavy Melt. Steel	21.00-22.00
Machine Shop Turnings	14.00-15.00
Short Shovel Turnings	14.00-15.00

Cast Iron Grades

No. 1 Cupola Cast	31.00-32.00
Charging Box Cast	24.00-25.00
Heavy Breakable Cast	22.00-23.00
Brake Shoes	22.00-23.00
Clean Auto Cast	31.00-32.00
Burnt Cast	23.00-24.00

Railroad Scrap

R.R. Malleable	23.00-24.00
Rails, Rerolling	28.00-30.00
Rails, Random Lengths	23.00-24.00
Rails, 3 ft. and under	29.00-30.00
Uncut Tires	23.00-24.00
Angles, Splice Bars	30.00-31.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	22.00
No. 2 Bundles	20.00
Long Turnings	20.00
Short Shovel Turnings	19.00
Cast Iron Borings	18.00
Bar Crops and Plate	25.00-26.00
Cut Structurals	25.00-26.00

Cast Iron Grades

No. 1 Cupola Cast	33.00-34.00
Stove Plate	30.00-31.00
No. 1 Wheels	30.00-31.00

Railroad Scrap

No. 1 R.R. Heavy Melt	24.00
R.R. Malleable	nominal
Rails, Rerolling	30.00-32.00
Rails, 3 ft. and under	31.00-32.00
Angles and Splice Bars	31.00-32.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
Nos. 1 & 2 Bundles	18.00
Machine Shop Turnings	12.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00

Railroad Scrap

No. 1 Heavy Melting	22.00
Wheels	22.00
Rails, Random Lengths	22.00

SEATTLE

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	17.50
Nos. 1 & 2 Bundles	18.00
No. 3 Bundles	nom.
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Punchings & Plate Scrap	30.00
Cut Structurals	30.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00
Heavy Breakable Cast	20.00-22.00
Stove Plate	25.00
Unstripped Motor Blocks	20.00
Malleable	25.00
Brake Shoes	25.00
Clean Auto Cast	25.00
No. 1 Wheels	25.00

Railroad Scrap

No. 1 R.R. Heavy Melt	22.00
Railroad Malleable	22.00
Rails, Random Lengths	22.00
Angles and Splice Bars	22.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	28.00

Cast Iron Grades

No. 1 Cupola Cast	25.00-30.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	26.00

HAMILTON, ONT.

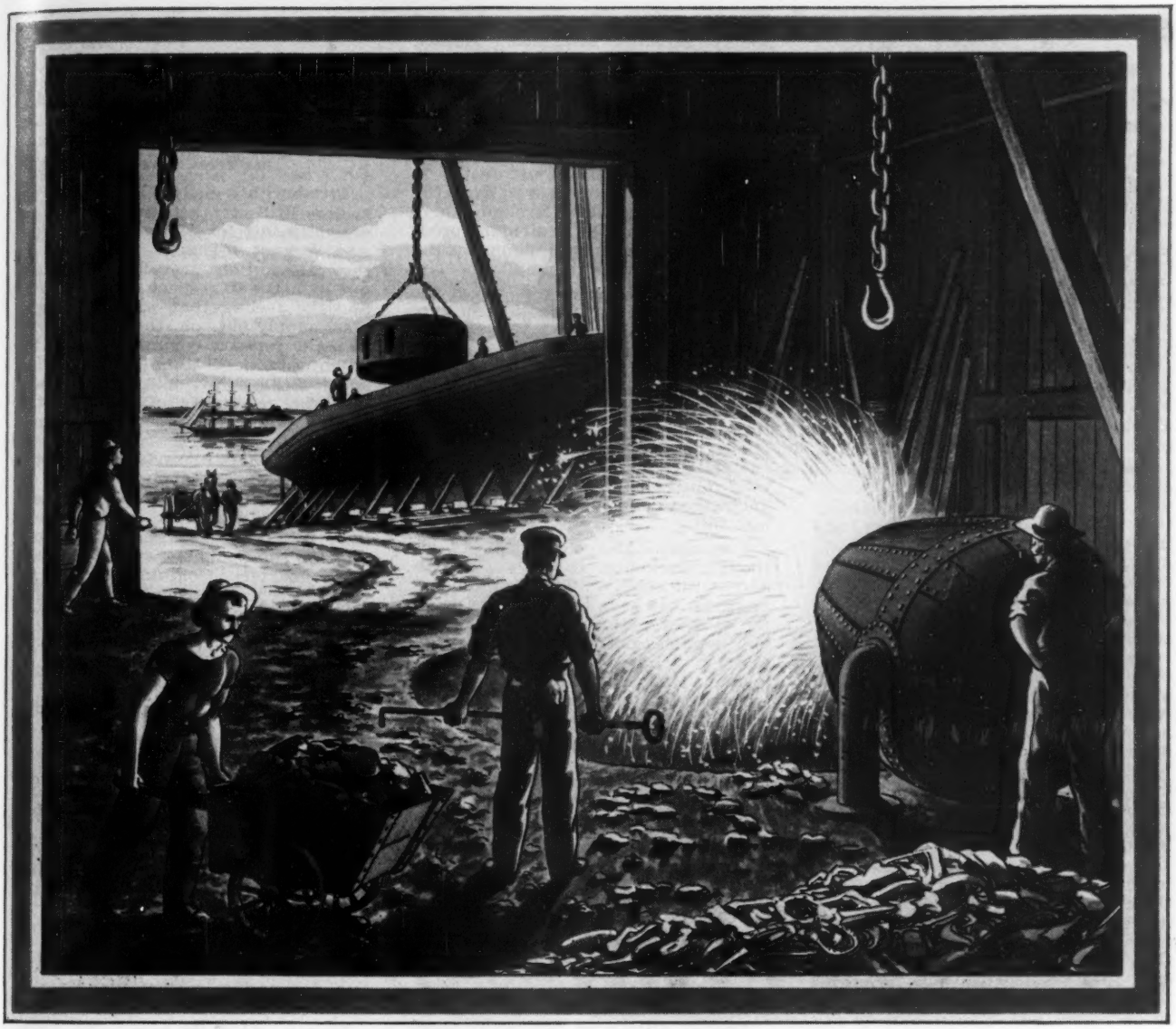
(Ceiling prices, delivered)

Heavy Melt.	$23.00
No. 1 Bundles	23.00
Mechanical Bundles	21.00
Mixed Steel Scrap	19.00
Mixed Borings, Turnings	17.00
Rails, Remelting	23.00
Rails, Rerolling	26.00
Bushelings	17.50
Bushelings, new factory, prep'd	21.00
Bushelings, new factory, unprep'd	16.00
Short Steel Turnings	17.00

Cast Iron Grades*

No. 1 Cast	48.00
No. 2 Cast	44.00

* Removed from price control Aug. 9, 1947; quoted on basis of f.o.b. shipping point.



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Sheets, Strip . . .

Leading sellers expected to revise extras soon on sheets and strip

Sheet Prices, Page 152

Philadelphia—Bethlehem Steel Co. has revised certain extras on sheets to meet competition. It is understood that these changes place schedules on practically the same basis as prevailed around the first of the year. Certain other sheet and strip mills also are revising their extras to meet competition.

Aviation Supply Office, Navy department, this city, will close bids May 11 on 105 tons of stainless sheets and strip for various deliveries.

New York—Leading sellers of sheets and strip are reviewing schedules on extras, with the probability that over the next few weeks, and likely in some cases sooner, there will be various revisions. Some upward revisions as well as reductions may materialize; nevertheless, it is expected that on a general average schedules will be lower.

So far leading sellers have adhered closely to their present schedules, although buyers have been looking for concessions in extras to precede any important reductions in standard base prices.

While certain mills have not formally opened their books on tonnage for shipment beyond July on major products, the majority are accepting business for the entire third quarter.

Sheet mills generally expect to maintain high operations throughout the current quarter unless labor difficulties, particularly in the coal field, force a reduction in operations late in the period. They are still having some spot openings in their schedules, due to deferments and cancellations, but so far have had little difficulty filling in these gaps.

Boston — Extreme caution marks buying of flat-rolled products which is reflected in absence of forward orders. Most inquiry is tied to prompt delivery and, in sheets, only galvanized occupies a position flat-rolled has held for so long period. Warehouses are cancelling or moving back sheet deliveries. For all practical purposes, consumer allocations are out with impact of f.o.b. mill selling more sharply drawn. Users are drawing on inventories which are not being depleted to the extent expected due to failure of general business to pick up in April. Most interests look to May for this improvement with a wary eye on the automobile industry.

Pittsburgh — Continued improvement in sheet and strip demand-supply position is noted with some sellers now freely predicting distribution will be on "wide-open" basis by early third quarter. Time table of the indicated supply-demand balance is expected to depend largely on trend in production schedules among automotive concerns for early third quarter. Fact some nonintegrated interests still are quoting premium prices on cold-rolled strip and most major producers still have substantially higher hot and cold-rolled sheet and strip extras than Carnegie, Weirton and Great Lakes is another indication that demand continues to exceed supply in most instances. Reason other interests have not yet followed Great Lakes and Weirton in reducing sheet and strip extras to Carnegie's competitive levels also may be explained in part by announcement of pending adjustment in extras by the latter company. Adjustments in product extras momentarily expected to be announced by Carnegie likely will be made on an individual product basis rather than announcing the changes for all items simultaneously.

Detroit—Reference on p. 145 of the April 25 issue to reduction in size extras announced April 16 by Great Lakes Steel Corp. here was incorrect in that the changes involved hot-rolled sheet and strip only. Extras on these products reverted to where they were last October when an increase was effected and are now competitive with other producers. Cold-rolled sheet and strip extras are unchanged, and were not increased last fall.

Cincinnati—Demand for sheets, although slackened, is not yet in balance with supply. Trend of buying, however, has been to anticipate needs for a shorter period. Hence, orders and inquiries do not give a clear indication of second quarter requirements. Dullness in some specialties is especially noted in stainless.

Birmingham—Tightness in sheets remains. Mills continue to report a wide distribution of the product, demand for which increased materially in this section over the past several years. Production is at virtual capacity, but a considerable tonnage continues to go into tin plate.

St. Louis—Granite City Steel Co. has under consideration a revision of extras, details of which may be announced soon. Probability is there will be a decrease in extra charges on wide sheets and an increase on narrow, the amounts in general offsetting each other.

Dallas—Supply of flat-rolled products is improving while demand is declining in this area. Fabricators are more cautious in adding sheets to their stocks. No price reduction has yet appeared in the general price structure, though some warehouses are making concessions and some mills are beginning to make bids for orders in the area.

Los Angeles—Production of sheet and strip does not yet match demand, but the day of balance is not far off. Buying continues on a hand-to-mouth basis, with consumers working off inventories as much as possible, and keeping a watchful eye on steel prices. Sheet supplies are being offered here by eastern interests in steadily increasing tonnages. Despite the generally slackened demand for steel, producers remain confident of continued long-term growth in western requirements. Kaiser is pushing its $36 million expansion program at Fontana, and expects to have the new production facilities, including a sheet mill, in operation by the end of this year.

San Francisco — Hand-to-mouth buying by most fabricators continues to ease demand for flat-rolled products. It is believed supply and demand may reach parity within two or three months. Tendency to wait for price reductions on steel products is becoming general.

Steel Bars . . .

Consumers continue cautious in making commitments for deliveries beyond June

Bar Prices, Page 152

Pittsburgh — Sellers report customers still are hesitant in making commitments for delivery during July and August. This is attributed to general caution prevailing throughout industry in respect to inventories and the feeling that with the easier steel supply outlook, there is no need to make forward commitments to the extent practiced throughout most of 1948. Sellers have filled order schedules for remainder of this quarter, however, and are not too concerned over current lag in new specifications. Cold-finished bar producers are experiencing a similar lull in new orders. As in the case of merchant carbon bar producers, cold finishers have full order books through June, and for some smaller sizes, well into third quarter. Cold-finished bar interests report easier steel supply situation from their hot mill sources.

Carnegie-Illinois Steel Corp. momentarily is expected to announce revision in schedule of extras covering hot-rolled carbon and alloy bars to more accurately reflect present day costs.

New York—Hot carbon bar sellers are not too concerned about maintaining a good rate of operations over the remainder of this quarter. However, they still are in position to book some tonnage for June, and are driving hard to build up third quarter schedules. To date, consumers have shown relatively little interest in making future commitments, especially for July which will be an important vacation period, with various consuming plants planning to suspend operations for two weeks.

Boston—At least two mills, withdrawing earlier on hot-rolled carbon bars, are again offering tonnage in this area; several producers have officially withdrawn consumer quotas on carbon bars, holding district allocations for a sales goal. Larger volume of carbon bars seeks placement with buying light by consumers and warehouses; operations with some cold finishing units are slipping.

Philadelphia—Hot carbon bar consumers, as well as buyers of cold-drawn bars and bar specialties, are now having little difficulty in obtaining all the tonnage they desire. They appear to be able to get fairly good shipments even from mills offering them highly favorable freight rates.

Chicago — Buying hesitancy that has been noted by both hot and cold-rolled bar producers is largely attributed to inventory unbalance, the popular sizes still being scarce and in strong demand. Bar requirements of some of the industries which have suffered the biggest loss in sales volume still appear reasonably high, and consumers in automotive and certain industrial equipment lines take up a good part of the slack.

Birmingham—Bar production continues high with demand consistent, mostly for concrete reinforcing. Merchant bar demand is described in mill quarters as comfortable.

Plates . . .

Plate Prices, Page 153

New York—Plate competition is increasingly keen and while there have been no further reductions in premium prices in the past several days, consumers look for some additional adjustments in the near future, at least on the part of certain producers. Eastern mills still have some capacity left for June rolling, but are confident enough business is in sight for good operations into the summer, even though trend may be downward.

Boston—Except for shipbuilding, plate demand has slackened materially, notably for small tank construction. Deliveries are improving and in some cases producers are forced to dig to fill June schedules. Cutbacks in plates have affected forward volume chiefly and late second quarter schedules are more difficult to fill, although some mills are still well booked on lightest gages.

Philadelphia—Plate business continues to decline. One district mill reports that more tonnage was canceled during the past two weeks than new tonnage received. As a result, this interest has tonnage available for May delivery as well as June. In fact, most district mills are in position to take on new tonnage for shipment within the next four to five weeks. Except for one mill, however, plate rollings are still at a nigh level in this district.

Birmingham—Moderate increase in cutbacks and cancellations is evident in plates, according to mill sources, but not enough to materially affect the general picture. Quite a sizable tonnage has been made available through slackened car production at Bessemer, but the wide distribution spreads the plate tonnage rather thinly.

Dallas—As supply of plates becomes steadily more plentiful, fabricators are getting sufficient materials to meet all immediate needs and are beginning to replenish stocks. Some processors, however, are not too optimistic, in face of increasingly competitive conditions in their own markets, and are accumulating inventories only for short-term future needs. Some instances of rather sharp discounts to consumers by fabricators are reported, indicating a continuing recession in demand for pipe and oil field tanks.

Los Angeles—Plate supplies still are inadequate, although delivery time for most grades is improving. Plates are one of the few steel products which are not being offered in this district in substantial volume by eastern mills. Demand remains strong from pipe fabricators, and has been augmented in recent weeks by a revival in requirements for oil tanks. During April, one builder booked orders for more than 60 large bolted tanks from major refineries.

San Francisco—Plates supplies continue scarce and demand continues active. A slight slackening in pressure for lighter gages is more than offset by strong demand for heavy plates.

Seattle — Plate fabricators report increased inquiry for projects involving small tonnages. In addition, several large contracts are either pending or will be up for bidding soon, including oil tanks at Whittier, Alaska.

Tin Plate . . .

Tin Plate Prices, Page 153

Pittsburgh—Despite better domestic pig tin stock situation and indicated increase in pig tin output over coming months, most tin plate producers do not foresee significant easing in coating regulations because of generally conceded need to augment inventories as much as possible in event of military emergency. World production of tin this year is expected to approach 180,000 tons, in contrast to 150,000 tons in 1948.

Hesitancy on part of some consumers to get on mill books for third-quarter delivery is attributed to inventory adjustments in some instances, while others believe that with an easier supply situation there is no need of making commitments well ahead, particularly in view of possible downward adjustment in some extra charges. Offsetting this situation is prospect of a coal or steel strike this summer. Trend in specifications for tin mill products throughout May is expected to indicate general extent of demand throughout remainder of this year. Most trade officials still are forecasting a 4 million ton tin plate year.

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Structural Shapes . . .

Structural Shape Prices, Page 153

New York—Structural bookings in March of 147,637 tons represent an increase of 37 per cent over February and 14 per cent over January. However, the first-quarter total, according to the American Institute of Steel Construction, is down some 23 per cent from the corresponding period of 1948.

March shipments are estimated at 178,256 tons, compared with a revised total of 146,341 tons for February and a revised total of 152,110 tons for January. The combined total of 476,707 tons represents an increase of five per cent over the same months of last year.

Backlogs as of Apr. 1 and for the following four months only stand at 582,406 tons against 596,886 tons at the same time last year.

Contract totals for February and January, as recently revised, stand at 407,324 tons and 129,103 tons, respectively. Estimated total for the first quarter is 384,064 tons.

Boston—Slack in private construction is emphasized by failure of public works programs to get underway. For this season, bridge inquiry is notably slow and some district contractors are quoting on more work in other areas. Fabricating shops are buying plain material on a job-to-job basis. Less tonnage is on books and available for fabrication over the next three months with shipments in excess of new orders.

Philadelphia—Shape supply is increasingly easy, with fabricators and warehouses having little difficulty getting specifications desired for delivery before the end of this quarter. Some producers, in fact, can make shipments against new orders within four to five weeks, so pronounced has been the drop in demand. Jobbers, incidentally, while taking in new tonnage, are concentrating more on working off odd sizes and forms taken in when demand was less selective.

A fairly substantial amount of imported shape tonnage also continues in stock along the eastern seaboard, which agents are endeavoring to dispose of in some instances at below standard warehouse prices.

After having suspended steel production temporarily, the Phoenixville, Pa., producer, again is producing on a limited scale.

A slight improvement is noted in small structural demand, but new large jobs are lacking and most of those now pending should be placed shortly.

Dallas—Availability of structurals in this area has about come abreast current requirements, with some slight improvement noted the past week in the only item still said to be somewhat tight—wide flange shapes. In some instances 24-inch material is beginning to be carried in stock for inventory convenience by some suppliers. Residential and commercial building activity continues at an active clip in Texas, running some $30 million ahead of last year's total at this time. There are numerous projects that have been publicly announced on which work is being deferred for price considerations, thus causing belief in some quarters that greater stabilization in the construction industry is developing.

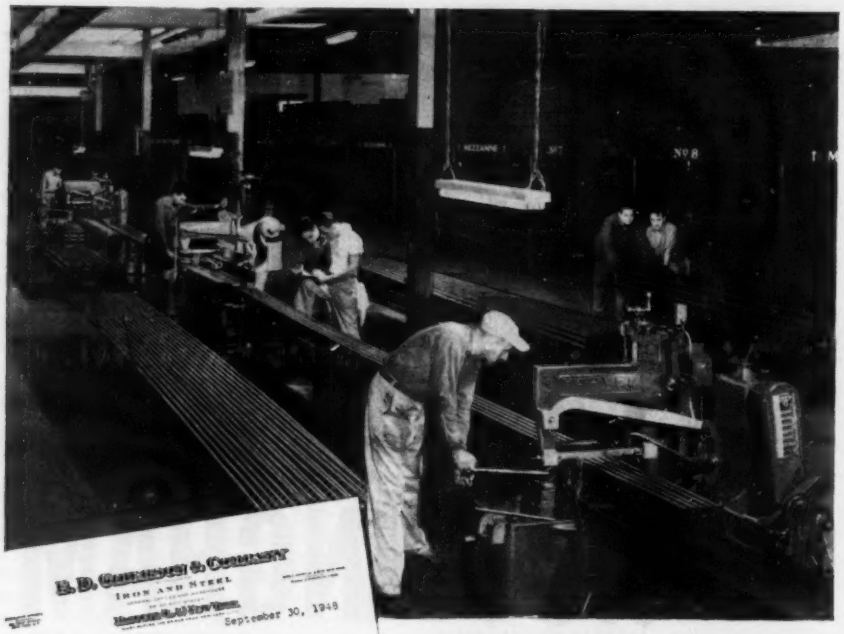
San Francisco—New building construction shows no signs of immediate pick-up and demand for structural items continues to slide. With exception of a few items, material is in more than ample supply.

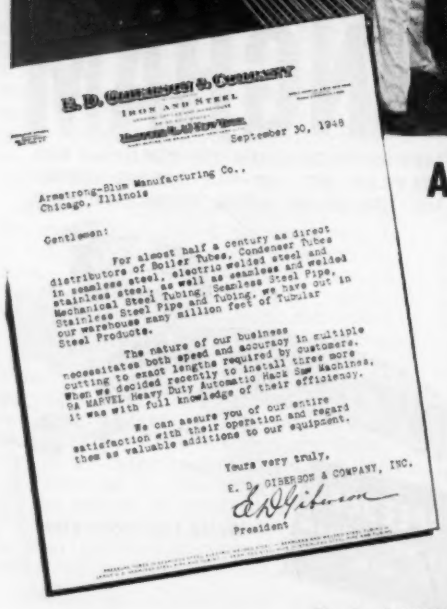
Reinforcing Bars . . .

Reinforcing Bar Prices, Page 152

Los Angeles—Demand is tending slowly upward, although price uneasiness has been a factor in holding up a number of projects which were scheduled for release. Deliveries are greatly improved, and bar supplies are ample for most needs. Large-scale housing continues to require substantial tonnages in this district. Metropolitan Life Insurance Co.'s current expansion of its Parklabrea housing project is taking 13,500 tons of reinforcing bars.

Seattle—Rolling mill staffs are under constant pressure for estimates on projects involving reinforcing bars. Public works demands are of major proportions while small jobs of less than 100 tons each present a substantial aggregate. Producers expect the current year will show a volume equal to that for 1948. Backlogs are still large.

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Iron and Steel
September 30, 1948

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Tubular Goods . . .

Leading producers reduce galvanized pipe prices $2 further on lower zinc costs

Tubular Goods Prices, Page 153

Pittsburgh — Jones & Laughlin Steel Corp. has followed other major pipe producers in reducing galvanized pipe prices $2 per ton or one point higher discount. New discounts announced by Fretz-Moon Tube Co., effective Apr. 25, are as follows: ⅛-inch standard weight galvanized pipe T&C, 12½ points; ¼-inch pipe, 14½ points and ⅜-inch pipe, 10½ points. A. M. Byers also reduced galvanized wrought iron pipe quotations one point to reflect lower zinc costs.

Pipe producers' order backlogs are still well extended, notably for line pipe. However, an increasing volume of cancellations have been received in recent weeks for oil country goods such as drill pipe and casing, while jobbers' stocks of standard pipe are tending upward for first time since prewar.

Boston—Butt weld steel pipe is easier and some distributors are not taking in full allotments; caution is emphasized by fact all leading pipe producers have withdrawn consigned stocks and tonnage is billed when shipped, reflecting a more sensitive buying policy by distributors. Seamless pipe has slipped less than butt weld, demand by utilities sustaining shipments.

Burlington, N. J.—Effective Apr. 25, the United States Pipe & Foundry Co., this city reduced its general selling prices on cast iron pipe and fittings $7 per net ton.

Butler, Pa.—Fretz-Moon Tube Co. Inc. has reduced its prices for galvanized pipe, effective as of Apr. 25, reflecting the recent decreases in the price of zinc. The new discounts on standard weight galvanized pipe, threaded and coupled, are as follows: ⅛-inch, 12.5 per cent; ¼-inch, 14.5 per cent; ⅜-inch, 10.5 per cent.

Dallas—Demand for oil country goods is showing some easing, as the aftermath of an oversupply of oil and beginning of price cuts. Development operations continue at a normal rate. Practically all grades of pipe are now in good supply, except 5½-inch, which continues short.

Los Angeles—What is believed to be advance buying by several major oil producers has brought a noticeable revival in pipe equipment and tank requirements from this outlet. Whether or not the upturn becomes general in the petroleum industry, the current specifying of several companies is substantial. Supplies generally are adequate, with the exception of spot shortages in material for heavy pipe.

Wire . . .

Wire Prices, Page 153

Pittsburgh — Competitive situation in merchant and manufacturers' wire items appears greater than that in most other steel products. Moderate seasonal improvement in demand for merchant wire products has developed, but not to the extent hoped for by leading producers. Jobbers and leading consumers apparently are inventory conscious and this condition has been accentuated by reports of pending lower price levels. The fact that mills also are able to promise relatively prompt deliveries is another factor encouraging customers not to order well ahead.

Portsmouth Steel Corp. reports that its wire rod quotations have been reduced to competitive levels and that the company has adopted the policy of meeting competition on individual selective basis, as contrasted with former industry-wide basing point practice.

Boston — Five contracts totaling $933,008 have been placed by Springfield armory for various parts and tool combinations for .30 cal. rifles; two Connecticut clock manufacturers and Novelty Tool Co., Spencer, Mass., tool combinations, share the volume.

Cleveland — Heavy pressure for manufacturers' wire has eased to the extent that one company's mills can make shipments of standard commercial items within two weeks after orders are placed. Somewhat longer time is required for delivery of specialties. Because demand is still somewhat in excess of capacity production, the producer continues its quota distribution system. The automotive industry is the dominant factor now in sustaining demand for manufacturers' wire.

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Pig Iron . . .

Pig Iron Prices, Page 154

Pittsburgh—Tempo of foundry operations among jobbing shops continues to show little signs of improvement, with many concerns operating three to four days a week, while a number of others are shut down. Captive foundries serving consumer goods industries also have experienced substantial reduction in order backlogs. Despite reports of balanced pig iron supply-demand in other areas, not much additional iron has been offered to consumers here from outside sources. A number of foundry interests anticipate a reduction in pig iron prices in the near future. However, the lone merchant foundry iron producer states no such action is contemplated at this time. Return to normal price relationship between cast scrap and pig iron has prompted many foundries to increase proportion of pig iron in their melting operations. This trend has been offset somewhat, however, by unusually sharp decline in cast scrap prices in recent weeks, making it more economical to use scrap than pig iron in some instances.

Globe Iron Co., effective Apr. 25, reduced silicon differentials on blast furnace silvery pig iron from $1.25 per one-half per cent silicon to $1. Base price for 6.50 per cent silicon remains unchanged at $59.50, f.o.b. Jackson, O.

It is reported that pig iron interests in the Kentucky area have been offering foundry iron here at competitive prices. Some 500 workers of Westinghouse Air Brake Co., Wilmerding, were laid off last week because of a reduction in freight car building schedules.

New York—Pig iron buying continues spotty, with shipments into this district for the month just closed down from March, in the experience of most sellers. However, district foundries are making inroads in their stocks, including much high priced iron. This brings nearer at hand the time when consumers will again be more active in the market. At the same time, though, no early improvement is expected, with district foundries operating three or four days a week, on an average.

Far East Metals Corp., a San Francisco concern handling Austrian pig iron, and noted in a recent issue as low bidder, has been awarded the 60,000 tons of basic for Japan by the Army Procurement Office in Chicago. Its price was $55.75, c. & f. Yokohama. Originally it was reported that all bids had been rejected; however, shortly thereafter the procurement agency advised bidders that certain technicalities had been adjusted, with the low bidder awarded the contract.

Boston — Most melters have adjusted to normal ratios between pig iron and scrap with the former in ample supply. Considerable high cost foreign iron remains to be worked off, due in part to lower consumption than anticipated when this tonnage was bought. Although current inventories are not considered high for normal output, most users are not inclined to build up stocks. Basic producers have generally gone along on the recent $1 reduction.

Philadelphia—Pig iron sellers believe that the trend in demand is nearing bottom, although they see little sign of improvement over the remainder of this quarter. In fact, some leading sellers believe that May tonnage will be down from April. Consumers still have high-priced stocks to work off, although they are making some progress in this direction.

Buffalo—An expected withdrawal of one furnace, probably within the week, is not likely to cause any real supply problem in the pig iron market. Further easement in demand for iron is reflected in increased competition among sellers. Leading local suppliers of merchant iron have now readjusted their prices downward to meet shading of quotations by outside sources. Wickwire's local plant noted a falling off in pig iron orders, but business still on hand is ample to avert any immediate shutdown of its two blast furnaces.

Chicago—Optimism over an upturn in castings demand is beginning to pervade job shops, but nobody is making any guesses as to what the outlook will be past the middle of the year. Speculation is that jobbing shops will be able to raise their operating levels at just about the time captive shops, most of which have sustained operations relatively well, will taper off. Pig iron sellers, moving the bulk of their tonnage to captive foundries, have noticed a con-

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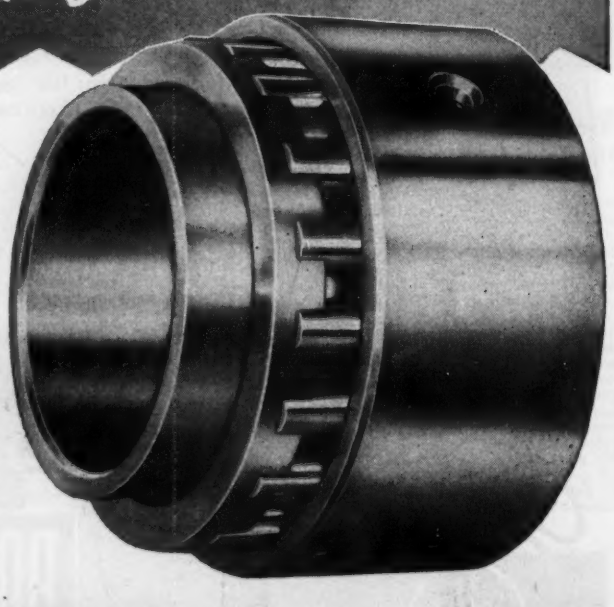

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traction in shipments but report generally that the aggregate tonnage is very satisfactory. Rate of district blast furnace activity would indicate that the average 3 to 4-day operations of job shops here is not having too great an effect on overall merchant iron demand. Stocks of malleable iron from one furnace are being built up in anticipation of a run on spiegeleisen. Price of district iron is steady as is that of foundry coke, although a number of premium price operators have recently scaled down their quotations to nearer the competitive level.

Cincinnati—Inquiries for castings are more numerous, giving hope for an early upturn in the melt which continues light throughout the district. Shipments of pig iron are still below the allotment levels of recent months as melters strive to hold inventories to a bare minimum.

Birmingham—Pig iron inquiry has been light in this territory, especially over the past couple of weeks, but merchant iron melters anticipate a pickup in demand, especially after the end of the second quarter. The price tone is steady.

St. Louis—Demand for pig iron continues to decline among virtually all customers except farm equipment manufacturers and sheet mills. Production holds to 1100 tons daily, 100 tons above a month ago, and ironmakers are enabled to build up ground stocks gradually. They anticipate a pickup in pressure in June, however, since many buyers of foundry products have worked off excess inventories of castings. Some of these are reported already finding themselves below a safe level based even on the lower current level of orders. Some iron salesmen expect the foundries' "bounce" back into the market may be substantial

Seattle—Foundries are more concerned in booking new business than they are in their supplies of raw materials. Ample tonnages of cast iron scrap are available at the going price of $25 to $30. Pig iron prices are unchanged. This item is available in sufficient volume for current needs.

Iron Ore . . .

Iron Ore Prices, Page 151

Cleveland—Lake Superior iron ore shipments from the upper lakes increased to 2,268,908 tons during the week ended Apr. 25 from 1,842,813 for the preceding week and 2,663,522 for the like week a year ago, according to the Lake Superior Iron Ore Association, this city. This brought the cumulative total for the season to date to 7,438,669 tons compared with 5,806,360 for the like period last year.

Shipments from United States ports alone totaled 2,255,176 tons last week, an average daily loading rate of 322,168 tons, making the cumulative season total 7,393,300 tons, or 1,629,381 tons ahead of a year ago.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 154

Pittsburgh—Beehive foundry coke prices continue unchanged here within the range of $16-$18 despite the fact that supply well exceeds demand. Some weakness is noted in Connellsville beehive furnace coke with a reduction of 50 cents in the higher side of the price range to a level of $13.50 to $15.

Boston—New England Coke Co. has reduced foundry coke 65 cents per ton to $22.70 delivered within $4.03 freight area, effective Apr. 25.

Philadelphia—Oven coke prices have been reduced 60 cents a ton in this district, now holding at $20.45, Philadelphia ovens; $20.40, Swedeland, Pa., ovens.

Pig Iron Output Increases

New York—Blast furnace operations were stepped up to 97.1 per cent of capacity during March from 96.5 per cent for February, resulting in a rise in production to 5,820,161 tons of pig iron, ferromanganese and spiegeleisen from 5,223,409 tons in the preceding month. This brought the first quarter output to 16,778,143 tons compared with 15,053,477 tons in the like 1948 period, according to the American Iron & Steel Institute.

Production of pig iron alone totaled 5,761,872 tons in March and 16,602,902 tons in the first quarter. Distribution of first-quarter production by districts was as follows in net tons: Pittsburgh-Youngstown, 6,305,769; Chicago, 3,459,784; eastern, 3,196,625; Cleveland-Detroit, 1,734,764; southern, 1,229,265; and western, 676,695.

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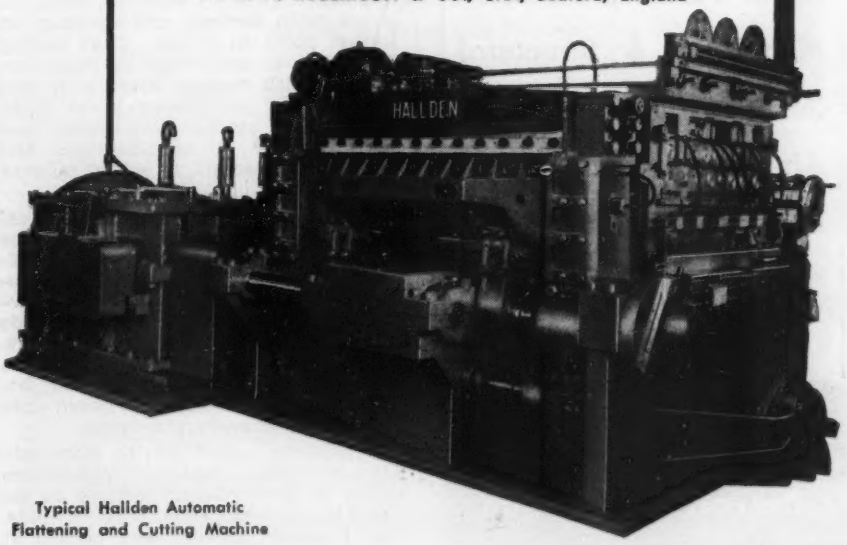

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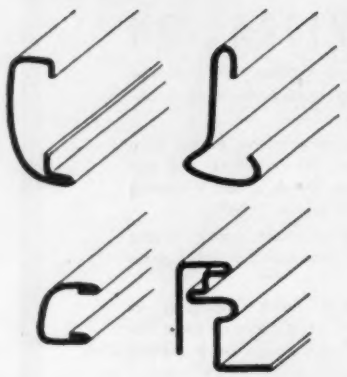

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Scrap . . .

Scrap Prices, Page 158

Pittsburgh—Further weakness in scrap quotations developed here last week with a small sale of No. 1 heavy melting reported at $24, off $1. No. 2 was quoted nominally at $22. Crushers reduced buying prices for machine shop and mixed borings and turnings to a range of $14.50 to $15.50. Sale of low phos at $26 was also noted.

Foundries remain out of the market except for a few small lot purchases, which established a price range of $25-$26 for cupola cast and $30-$31 for No. 1 machinery. Between lists, railroad No. 1 heavy melting was awarded at $25.50; specialties at $31. The leading scrap consumers continue out of the market for dealer scrap. Many interests are attempting to reduce high-priced inventories while an influx of customer scrap continues at a high level. Many mills no longer are compelling customers to return scrap, although accepting all offerings. This condition has resulted in additional scrap channeled through dealers' yards.

The sharp drop in scrap prices since the first of the year to near OPA levels has resulted in almost complete drying up of scrap collections by peddlers. This condition is considered serious by some interests because of a possible reversal of the present demand-supply situation in scrap. Renewal of German scrap commitments is not likely.

Philadelphia—That scrap prices may be close to bottom on the present decline is indicated by few changes in the steel grades and none in the cast grades, the latter now holding steadily in price for the second consecutive week. However, few trade interests are willing to definitely commit themselves pending further developments. There is still little trading in any direction. In some grades, such as low phos scrap, prices are purely nominal and subject to further test. Short shovel turnings are off to around $17-$18, delivered.

Boston—Scrap prices continue to sag on light buying. Usual differentials between open-hearth grades are not holding, but No. 1 bundles approximate No. 2 heavy melting or slightly higher. Latter is down $1 a ton with borings and turnings at lowest point in years. Cast buying is limited to small lots by shops operating with meager inventories and this type of purchasing lends slight strength to prices. Consumers are more critical on specifications and yards are reluctant to sell at current levels.

Buffalo—Except for a mild revival in buying by Canadian interests, the scrap market continued in the doldrums last week. A small consignment of cast scrap was reported moving across the border at a shade above the quoted local range of $28-29. In addition to the cast sale, two barge consignments carrying slightly more than 2000 tons moved into Canada from eastern sources.

Weakness continued to dominate the market. Leading consumers clung to their sideline position as the market was virtually bare of bids. No. 2 heavy melting was quoted at $20-$21 a ton. Dealers reported yard activity was light, but were taking in material at about $17 a ton.

Detroit—Large month-end automotive lists have appeared in the past two weeks, one broker figuring he had entered bids on close to 100,000 tons. Sentiment continues weak and, although there are few sales to confirm prices, quotations on steel grades are off another $2 per ton, borings and turnings unchanged, and cast iron material down $2. Reports are current of sales by motor plants to specific mills at prices above published figures, a reciprocal practice apparently justified by mills on the basis of goodwill, receiving orders for new steel tonnage and preventing the scrap market from skidding too far. This seems to be the old "earmarking" technique in reverse. Whereas for a number of years fabricators have been shipping scrap to mills in exchange for new steel allocations, now they are selling scrap at premium prices in exchange for the favor of their steel purchasing. Trade observers view the situation as temporary since it is just another move to suspend the law of supply and demand on which the scrap industry has operated historically.

Cincinnati—The scrap market still fails to show signs of leveling off. Prices of cast grades and rails declined further with buying interest dulled by melters' aims to trim inventories. Inquiries were spotty and accompanied by pressure on quotations. Movement of scrap is down from seasonal expectations.

Chicago—Feeling that the bottom of the scrap price fall has been reached is prevalent in the trade, notwithstanding continuation of many of the conditions which were responsible for the sharp break. Light buying for May by several district mills indicates the new month will be nearly as void of activity as previous ones have been. It is felt that mills which have not already placed orders probably will not; stocks still are believed to be very high. One buy of No. 1 railroad and industrial heavy melting scrap was noted at $24, a price presumably based on reciprocity, but especially significant because it abolishes the premium which railroad material traditionally commands. Electric furnace scrap price also has declined to the level of open-hearth material. With virtually no market for foundry grades, consumer price is indefinite. Price action from now on seems due to be confined to minor fluctuations, any concerted attempt to reduce prices further being expected to cut collections drastically. Upsurge in demand, on the other hand, would firm prices up, but, according to most observers, not to anywhere near last year's abnormally high levels.

Birmingham—Marked weakness continues to be evident in scrap. Prices are indefinite and nominal in view of the fact that practically no scrap is being bought, although it is known several cars of heavy melting were bought late in the week at $20. Little scrap is reaching the market because most truckers have quit in view of low prices.

St. Louis — Unchanged dealers' offering prices in the majority of scrap grades here last week sug-

gested the recent steady decline may be at an end. Consensus of brokers was that No. 2 melting steel was up $1 while No. 1 was off a like amount. Charging box and heavy breakable cast and 3-foot rails softened a trifle, but otherwise the list was steady. There were, however, no sales to confirm the trend. Dealers currently are cleaning up old orders and expect the next two weeks will show whether the decline is over.

Los Angeles—Steelmaking scrap is off $2 per gross ton, and is now being quoted on a new "f.o.b. car Los Angeles" basis. Bethlehem Pacific's plant here is being used as the basing point for scrap delivery to mills in this district. Scrap markets remain extremely confused and uncertain, with little material moving and dealers pessimistic. A number of small dealers, particularly in Arizona and Nevada, are reported to be leaving the business. Mills are taking extremely limited tonnages, relying for the present principally on stockpiles and off-shore material. Foreign scrap has been far from satisfactory, however, with one mill rejecting an entire shipload of 9200 tons for resorting. Foundry demand is virtually at a standstill, and No. 1 cupola cast is down $2 per ton to a nominal range of $25-$30.

San Francisco—Mills are more than amply supplied and are buying little domestic scrap. Offshore movement of material from Japan continues as the chief depressant to home scrap. Some observers are forecasting a further cut in scrap prices May 1.

Seattle—The steel scrap market is steady at $22 for No. 1 heavy melting and $20 for No. 2. Receipts have slowed, due to the termination of some contracts. Dealers assert they cannot afford to segregate at current price levels. Inventories have increased during the last month and current shipments are in excess of consumption. According to figures of the local office of the Institute of Pacific Relations, scrap stocks in Japan are now approximately 7 million metric tons. Several shiploads have arrived at Pacific Coast ports for melting here.

Export Price List Revised

New York—Reflecting reduction in price of zinc, United States Steel Export Co., U. S. Steel subsidiary, has announced the following new export prices, effective as of Apr. 21, on carlots with freight included to New York, Philadelphia or Baltimore.

	Per Cent off List
American Standard Pipe, T. & C.:	
Butt Weld, 2½ and 3 in., galvanized	24.6
Seamless, 3½ to 6 in., galvanized..	17.1
English Gas Tubes, T. & C.:	
Butt Weld, 2½ and 3 in., galvanized	26.5

Prices are subject to seller's current list of extras and deductions and conditions of sale. All sales are subject to seller's prices in effect at time of shipment.

Steel Case Hearing Deferred

Washington—Federal Trade Commission last week gave respondent attorneys in the steel case 60 days in which to write and present briefs in support of their motions that the case be dismissed. This means no resumption of hearings in the case before July.

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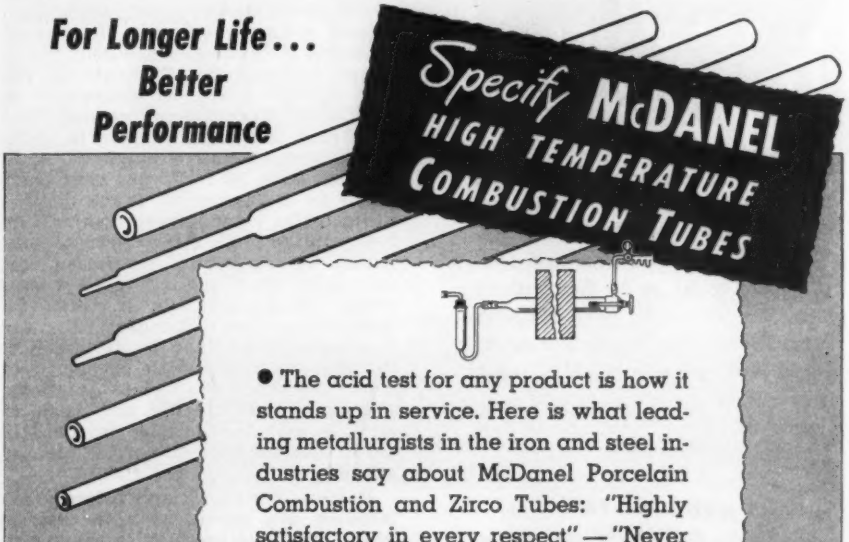

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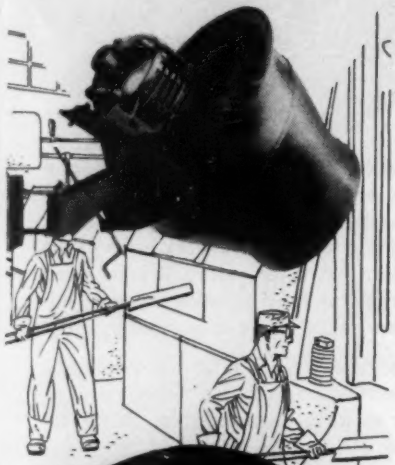

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Warehouse . . .

Warehouse Prices, Page 155

Philadelphia—Jobbers look for a further drop in business in May. Consumers, they say, are still working off inventories and in most instances contemplate no immediate upturn in their own business. In fact, they expect consumers to buy no more than is absolutely necessary until the steel price situation clarifies, possibly after wage negotiations in the steel industry have been concluded. Most distributors experienced at least some easing in business in April, even on a daily basis. Stocks were in better shape, but there was not the demand.

Jobbers claim it will still take some time to get stocks properly rounded out. They are now not having much difficulty getting in new specifications from mills, but they are having trouble moving tonnage laid in during the boom for substitution purposes. Some jobbers, for instance, have quite a little tonnage of this character in shapes and plates, such as overages and the like. The situation in bars, for some reason, does not appear to be so bad.

Warehouse prices on the major grades are unchanged, except in galvanized products, which reflect recent reductions in zinc. No. 10 gage galvanized sheets are now 7.33 city and 7.18 country.

Pittsburgh—Steel distributors have reduced galvanized sheet prices $2 per ton to the basis of $6.95 per 100 pounds for No. 10 gage to reflect successive one-cent declines in zinc quotations during recent weeks. No other price action is noted, although most interests anticipate considerable adjustments in base and extra quotations will develop out of pending revision in extras scheduled to be announced soon by Carnegie at the mill level. Some improvement in warehouse steel demand recently has developed, although decline in daily average shipments throughout April was off from 30 to 50 per cent compared to a year ago. Some distributors claim considerable competition has resulted from metalworking companies attempting to sell excess high priced or poor quality steel stocks, while continued efforts to reduce inventories on part of most customers is another important factor restricting new buying. With exception of heavy beams and plate sections, warehouse inventories are best in months and the outlook is for still better balanced inventories in months ahead.

Boston—Cutbacks and delivery extensions are prevalent with distributors, involving products in short supply since prewar, notably carbon bars and in some cases sheets and plates. Better balance in inventories is accompanied by lower demand at warehouse level and scattered price shading. Competition in selling is again apparent and most buyers, normally depending on mills for bulk of tonnage, are again dealing directly. Mill commitments are being revised and much forward volume erased.

New York—Demand for steel out of warehouse has leveled off at about the March rate with slight, if any, improvement. Number of orders is holding, but the individual average tonnage is smaller. Buyers are also more price minded with only galvanized sheets and hot-rolled strip officially marked down. Distributor stocks are moving toward balance with forward orders with mills cutback or extended on some products, notably carbon bars.

Chicago—Price changes on galvanized sheets, resulting from reductions in coating extras having their basis in zinc costs, have again been put into effect by leading distributors, prices now quoted at the warehouse being $6.95 and $7.00 per 100 pounds. Drop in zinc prices was so rapid in recent weeks that new prices were no sooner approved than they were obsoleted, but last week some semblance of order appeared to have returned.

Among the larger interests experience is fairly uniform as to the slowing down of inquiries with a resulting drop in shipment tonnage. However, stocks continue out of balance in major hot-rolled products, including sheets and strip, bars, small structurals and plate. Size distribution of cold-finished bars is also spotty, although this item is not considered particularly short. Receipts from mills are showing improvement both in regard to tonnage and time, but care is being exercised as to what items will be accepted in view of stock inequities. Distributors of specialties report inquiry continues at a relatively low level, with stainless and alloys and some tubular goods in good supply and in limited demand.

Cleveland—Virtual abandonment of the voluntary allocations program channeling steel into the building of railroad freight cars is increasing the tonnage of plates available to warehouses. Distributors are now able to get plate tonnage in excess of their quotas. Increased availability of steel from mills and reduced demand from consumers is putting warehouse stocks in better balance, and this includes some of previously scarce products such as plates, carbon sheets, and bar flats. Downward adjustment in prices continues.

Cincinnati—A tapering trend is noted in shipments of warehouse steel. Normal mill customers once again are relying on mills for material instead of scouring jobber stocks for auxiliary supplies, and other fabricators are buying in smaller individual orders. Stocks are better balanced than in many months, even in building steel for which demand has not shown anticipated seasonal improvement. Prices are being readjusted, partly in reflection of the competitive market.

Los Angeles—Recent rise in new orders has flattened out, and steel jobbers are inclined to feel that their activity has stabilized for the time being. Warehouse stocks are in much better balance, plates being virtually the only category in which supplies still are extremely limited.

San Francisco—Jobbers and their customers are buying spottily and selectively. Uncertainty of the price picture plus the general balance in inventories they have achieved makes most warehousemen cautious in future purchases. Volume shows little signs of picking up, and it is believed no steady buying will return until next fall when consumers' inventories

are readjusted to the reduced sales trend.

Seattle—Wholesale jobbers report the supply situation is generally easier and gray market operations have disappeared. While sheet supply has improved, it is far from plentiful, but within 60 days distributors expect to be able to meet demands. Plates continue tight, particularly wide flange, but the smaller sizes are in better supply. In some instances, buyers now receiving sheets after long delay find themselves overstocked in view of depressed business and are willing to resell.

Semifinished Steel . . .

Semifinished Prices, Page 152

Cleveland—Shrinking of demand for alloy steel and carbon conversion ingots has resulted in the closing of five government-owned electric furnaces at Republic Steel Corp.'s works at Canton, O. These furnaces, closed down at war's end, were put back into operation in response to the phenomenal demand for steel. Now that pressure for steel has eased somewhat, Republic is able to supply its customers' carbon conversion ingot and alloy steel requirements without using the government-owned electrics. To supply these requirements Republic last week was operating ten of its 13 electric furnaces and three of its six open hearths at Canton. At its Massillon, O., alloy plant it was operating three of its nine open hearths.

Heads Alan Wood Steel Sales

Conshohocken, Pa.—P. L. Francis has been elected vice president in charge of sales, Alan Wood Steel Co. He had been sales manager for the past few years and prior to that was in charge of the company's West Coast office.

Personnel Changes by Central

Harrisburg, Pa.—Number of important personnel changes were announced last week by Central Iron & Steel Co., this city. Norman A. Telsey, formerly New England district sales manager, has been named sales manager, New York district; Charles J. Sisto, formerly representative, Erie Bolt & Nut Co., Erie, Pa., has been appointed New Jersey district representative under the New York office; W. H. Spooner, formerly manager of the New York district, and prior to that New England district manager, returns to Boston in the latter capacity; Walter A. Hill, Philadelphia district sales manager, has resigned and will be succeeded by John Noll; Kenneth H. Rhoades, formerly district representative in central Pennsylvania, has resigned and will be succeeded by Robert M. Schein, formerly New Jersey representative; W. N. Lowe, formerly specialty parts representative, has resigned, and Robert N. Moffett, for the past 12 years with the By-Products Division, Lukens Steel Co., Coatesville, Pa., has been named sales engineer with headquarters in Harrisburg.

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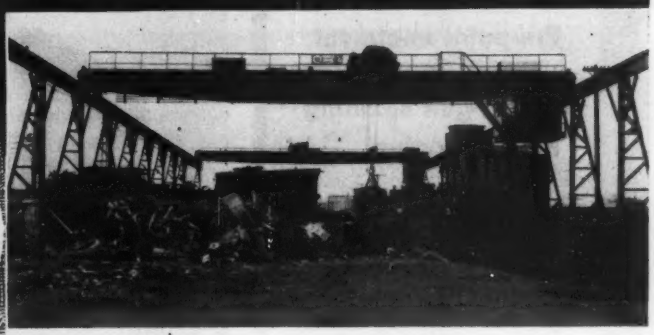

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Rails, Cars . . .

Track Material Prices, Page 153

New York—More new freight cars and locomotives were placed in service by Class I railroads in March this year than in any other month in more than 20 years, the Association of American Railroads announced last week.

Installations of new freight cars by Class I railroads and railroad-owned private-controlled refrigerator car companies totaled 10,556 in March, the largest number for any month since July, 1926. This brought to 27,493 the total number of new freight cars put in service in the first three months of 1949, compared with 22,770 in the same period in 1948.

Class I railroads installed 224 new locomotives in March, the largest number for any month in the past 25 years. Of the total number, 216 were diesel and 8 were steam. In the first quarter of 1949, Class I railroads put 498 new locomotives in service, of which 476 were diesel and 22 were steam. New locomotives installed in the same period of 1948 totaled 287, which included 281 diesel, 3 steam and 3 electric.

All railroads and private carlines had 73,129 new freight cars on order on Apr. 1, 1949. Of the total, Class I railroads and railroad-owned private - controlled refrigerator car companies on Apr. 1, 1949, had 67,-505 new freight cars on order.

Of the total number of new freight cars which Class I railroads on Apr. 1 had on order, 28,601 will be built in railroad shops and 38,904 in outside shops.

Class I railroads also had 1322 locomotives on order on Apr. 1 this year. These included 35 steam, 4 electric and 1283 diesel locomotives.

Canada . . .

Toronto, Ont.—Iron and steel production in Canada moved upward in January.

Production of steel ingots and castings that month totaled 284,707 net tons or 88.4 per cent of total capacity and compares with 280,425 tons in December, when the average was 87 per cent, and with 256,726 tons for January, 1948, or average of 85.2 per cent of the lower rated capacity of that time. Output in January, 1949, included 275,987 tons of steel ingots and 8720 tons of steel castings. Charges to steel furnaces in January included 156,103 tons of pig iron; 80,684 tons of scrap of consumers' own make and 81,378 tons of purchased scrap.

Production of pig iron in January totaled 183,074 net tons or 78.5 per cent of capacity, against 174,233 tons or 74.7 per cent for December.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1500 tons, warehouse, Carson Pirie Scott & Co., Chicago, to Bethlehem Steel Co.

850 tons, public school No. 33, Manhattan, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.

800 tons, science building No. 1, Queens College, New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

750 tons, power station, unit No. 3, Bellevue, Nebr., Loup River Power district, to Paxton & Vierling Iron Works, Omaha, Nebr.

570 tons, bridge project S-0413 —2—, Grand Junction, Colo., to Midwest Steel & Iron Works, Denver.

550 tons, Ladd air field powerhouse, Alaska, to Independent Iron Works, Oakland, Cal.; Kiewit-Morrison-Knudsen Co., general contractor, $3,090,000.

425 tons, F. W. Woolworth store, Hempstead, Long Island, to Grand Iron Works, Inc., New York.

420 tons, penstocks, Louisville, Mont., Bureau of Reclamation, Spec. 2577; 240 tons to Pacific Coast Engineering Co., Alameda, Calif., and 180 tons to Gunderson Bros. Engineering Co.

375 tons, section, Cross Bay and Conduit Blvds., Queens, New York, for City Department of Parks, through Gull Contracting Co., to the Harris Structural Steel Co., New York; this project was previously reported as placed with another fabricator.

340 tons, Benade Hall, Academy of New Church, Bryn Athyn, Pa., to Frank M. Weaver & Co., Lansdale, Pa.

200 tons, steel work on truss bridge, state project, Great Barrington, Mass., to American Bridge Co., Pittsburgh, bids direct on fabrication and erection Apr. 20, Department of Public Works, Boston.

200 tons, Seattle engineering shop, to Isaacson Iron Works, Seattle; Brazier Construction Co., Seattle, general contractor.

198 tons, St. Angela church, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

140 tons, Delaware county hospital, Drexel Hill, Pa., to Easton Steel Structurals, Easton, Pa.

115 tons, bridge Fl-06-05— 9—, Hudson, Wis., to Milwaukee Bridge Co., Milwaukee.

100 tons, repair shop, Caterpillar Tractor Co., Peoria, Ill., to Joseph T. Ryerson & Son Inc., Chicago.

100 tons, mining dredge for Alaskan interests, to Washington Iron Works, Seattle.

STRUCTURAL STEEL PENDING

5600 tons, Jackson Pier, 80, Philadelphia; Hughes-Foulkrod Co., that city, low on general contract.

600 tons, Woodville state hospital, Allegheny county, Pennsylvania; bids May 4.

500 tons, factory, V. La Rosa & Sons, Hatboro, Pa.; bids asked.

450 tons, plant addition, Owens-Illinois Glass Co., Bridgeton, N. J.; bids closed; noted last week as involving an unstated tonnage.

400 tons, including reinforcing bridge in Chugach National forest, Alaska; J. J. Badraun, Seattle, low $489,738, and recommended for award.

400 tons, section 4-A, state turnpike, Lebanon and Lancaster counties, Pennsylvania; Harrison Contracting Co., Pittsburgh, low on general contract.

305 tons, including 65 tons grill decking, 190-foot span swing bridge, Wishkah river, Aberdeen, Wash.; Roy T. Earley Co., Tacoma, low, $304,727.

180 tons, fixed wheel gate frames, Hungry Horse dam, Montana; Bureau of Reclamation, Denver.

150 tons, government motor vehicle building, Indiantown Gap, Pa.; bids asked.

125 tons, Washington state bridge, Pierce county; bids to Olympia, Apr. 29.

Unstated, 100-ton and 10-ton electric traveling cranes for Seattle light department; bids May 11.

REINFORCING BARS . . .

REINFORCING BARS PLACED

550 tons, Ladd Field, Alaska, powerhouse to Bethlehem Pacific Coast Steel Corp., Seattle; Kiewitt-Morrison, Knudson Co., joint contractors.

500 tons, army barracks at Anchorage, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Patti-MacDonald Co., general contractor.

400 tons, Washington state Agate Pass bridge, to Bethlehem Pacific Coast Steel Corp., Se-

attle; Manson Construction & Engineering Co., Seattle, general contractor.

200 tons, grain elevators in eastern Washington, to Bethlehem Pacific Coast Steel Corp., Seattle; Henry George, Spokane, general contractor.

200 tons, King county bridge, Seattle, and Seattle engineering shop, to Bethlehem Pacific Coast Steel Corp., Seattle.

120 tons, geophysical building, University of Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Lewis Construction Co., general contractor.

REINFORCING BARS PENDING

7000 tons, unit of Columbia Basin; J. A. Terteling & Sons, Boise, Ida., low; materials to be furnished by Bureau of Reclamation, Denver.

500 tons, Winchester Wasteway, Columbia basin, Washington state; bids to Bureau of Reclamation postponed to May 26.

150 tons, Washington state highway projects; bids to Olympia, May 6.

100 tons, Washington state highway projects; bids to Olympia, Apr. 29.

100 tons, Washington state highway projects; bids to Olympia Apr. 29.

Unstated, Admiral Way bridge, Seattle; bids in May; $120,000 available.

PLATES . . .

PLATES PLACED

350 tons, Seattle Gorge powerhouse penstock, to American Pipe & Construction Co., Portland, Oreg.; Guy F. Atkinson Co., Seattle, general contractor.

200 tons, welded pipe, Milwaukee Gas & Light Co., Milwaukee, to A. O. Smith Corp., Milwaukee.

151 tons, steel mains for supply line, Chewelah, Wash., to Hydraulic Supply Mfg. Co., Seattle.

100 tons, H-piling, Seattle engineering shop, to Bethlehem Pacific Coast Steel Corp., Seattle; Brazier Construction Co., Seattle, general contractor.

PLATES PENDING

100 tons, sheet steel piling, caisson project, Puget Sound Navy yard, Washington state; General Construction Co., Seattle, low.

Unstated, 500,000 gallon elevated steel water tank; bids to G. R. Soper, clerk, College Place, Wash., May 2.

PIPE . . .

CAST IRON PIPE PLACED

1500 tons, 12 inch cast iron pipe, Tacoma, Wash., local improvement project, Tacoma, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.

CAST IRON PIPE PENDING

Unstated, 18,600 feet 12 inch cast iron water pipe; bids to G. R. Soper, clerk, College Place, Wash., also alternatives; J. W. Cunningham & Associates, Portland, Oreg., engineer.

Unstated, 41,600 feet water mains; bids to Flora Engineering Co., Anchorage, Alaska, Apr. 28.

STEEL PIPE PLACED

Unstated, for Ampere, Washington, substation, Bonneville Power Administration, Portland, Oreg., to Consolidated Supply Co., Portland, low $12,317.

STEEL PIPE PENDING

Unstated, 1200 feet, 8 inch, standard black steel pipe; bids to E. E. Pattison, city recorder, Salem, Oreg., May 2.

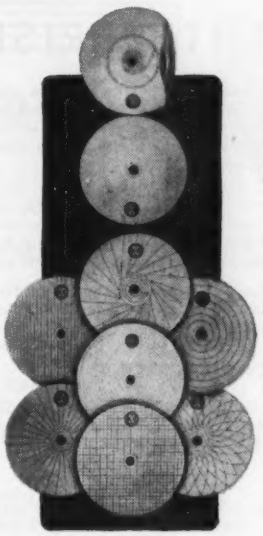
RAILS, CARS . . .

RAILROAD CARS PLACED

Wabash, 200 fifty-ton hopper cars, to its Decatur, Ill., shops.

RAILROAD CARS PENDING

Southern Railway, 200 seventy-ton steel covered hopper cars; bids asked.



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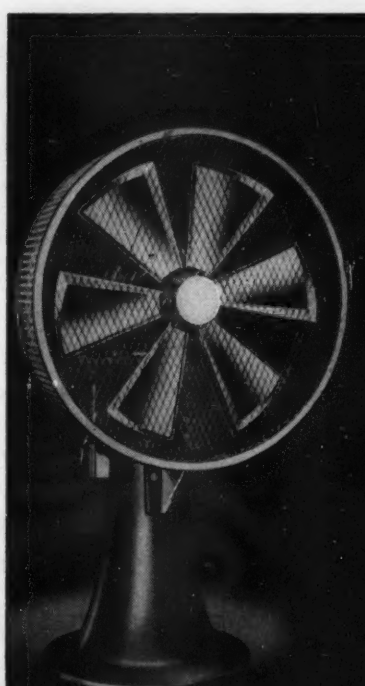

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CONSTRUCTION AND ENTERPRISE

ARKANSAS

LITTLE ROCK, ARK.—City of Little Rock plans construction of storm sewers at an estimated cost of $2 million.

NORTH LITTLE ROCK, ARK.—City of North Little Rock is undertaking a $1,497,000 sewerage diversion project in Dark Hollow area, Levy area, including pumping station; Kenneth Lefever, Gazette Bldg., consulting engineer.

PINE BLUFF, ARK.—City of Pine Bluff is installing $1 million sanitary sewer system extensions and improvements; A. E. Heagler, 315 Exchange Bldg., Little Rock, Ark., consulting engineer.

CALIFORNIA

EUREKA, CALIF.—City of Eureka will have a $2 million bond election for construction of three sewage treatment plants; Koebig & Koebig, Rowan Bldg., Los Angeles, consulting engineer.

LOS ANGELES—Union Hardware & Metals Co., 411 E. Second St., will build a $3,250,000 warehouse, Ferguson Dr. A. C. Martin & Associates, 333 S. Beaudry St., architect.

LOS ANGELES—University of California, Board of Regents, 451 N. Hilgard St., will build a $15,500,000 medical school; plans by Wurdeman & Becket, 3757 Wilshire Blvd., consulting engineer, L. T. Evans, 2500 W. Sixth St., and also plans by Douglas McClellan, 816 W. Fifth St., for an administration building to cost $1.5 million.

PACIFIC GROVE, CALIF.—Del Monte Properties, Del Monte, Calif., has awarded a $500,000 contract to Robert D. Bardell, 2733 Linden St., Oakland, Calif., for construction of a laundry; Gardiner A. Dailey, 210 Post St., San Francisco, and Skidmore, Owings & Merrill, 1 Montgomery St., San Francisco, architects.

SAN LEANDRO, CALIF.—John Deere Plow Co. has purchased a 40 acre site on east shore of San Francisco Bay for construction of a new distributing plant to service California, Nevada and Arizona; purchase price of acreage was $250,000.

SANTA ANA, CALIF.—Orange county sanitation districts 1, 2, 3, 5, 6, 7 and 11, 115 Church St., voted $8,308,000 bonds to construct a primary sewage treatment plant; Vinton W. Bacon, c/o owner, engineer.

STOCKTON, CALIF.—Acala Cotton Mills Inc., c/o J. Kessel, 3208 Pacific Ave., will build a $1 million textile mill.

CONNECTICUT

HARTFORD, CONN.—Hartford Gas Co., 233 Pearl St., will build a $130,000 gas conductor, precipitator and substation.

IDAHO

ARCO, IDAHO—United States Atomic Energy Commission, 1901 Constitution Ave. N. W., Washington, will build a $100 million atomic reactor testing station near Pocatello.

ILLINOIS

DECATUR, ILL.—A. E. Staley Mfg. Co. will build a $1 million plant.

INDIANA

ANDERSON, IND.—Nicholson File Corp., 32nd and Lynn Sts., has awarded a $100,000 contract to Harry Kelley Construction Co., 1807 Pearl St., for a plant addition.

IOWA

AMES, IOWA—United States Atomic Energy Commission, Lawton D. Geiger, area manager, has awarded a $1,149,000 contract to James Thompson & Sons, 222 E. Third Ave., for construction and completion of a research building to be erected on the campus of Iowa State College; Tinsley, Higgins & Lighter, 526 Liberty Bldg., Des Moines, Iowa, architect.

AMES, IOWA—Iowa State College, through the Iowa State Board of Education, will receive bids during June on construction of a brick and concrete building to cost about $800,000; Dougher, Rich & Woodburn, 302 Garver Bldg., Des Moines, Iowa, architect.

DAVENPORT, IOWA—Davenport City Hall Terminal Bldg., has awarded a $117,084 contract to Tunnicliff Construction Co., 105 Fillmore St., for construction of a terminal building.

DES MOINES, IOWA—Farmers Grain Dealers Association, 18th and Vine Sts., will build a $400,000 grain elevator.

DES MOINES, IOWA—Iowa Farm Bureau Federation, Farm Bureau Bldg., will build a $850,000 fertilizer plant.

KANSAS

GREAT BEND, KANS.—Central Kansas Electric Co-operative will build a generating plant; A. C. Kirkwood & Associates, 3102 Troost Ave., Kansas City, Mo., engineer.

KANSAS CITY, KANS.—Kansas City Wholesale Grocery Co., 1208 W. 12th St., will build a $100,000 warehouse.

WINONA, KANS.—Porter Marshall, Clay Center, Kans., and Ward Marshall, Salina, Kans., are building a grain elevator addition to cost $150,000.

KENTUCKY

SHELBYVILLE, KY.—Doty Monley, Frankfort, Ky., Lee R. Walker and Raymond Mitchell, Owensboro, Ky., Irvin Blakemore, Lawrenceburg, Ky., will build a $100,000 auction warehouse on U. S. 60.

LOUISIANA

HOUMA, LA.—George Broussard Inc., 510 Lafayette St., will build a $100,000 auto sales and service building.

MARYLAND

BALTIMORE—General Refractories Co., Chesapeake Ave. & Seventh St., Brooklyn, N. Y., is erecting a storage building.

BALTIMORE—Booth-Brenner Inc. is equipping a 2-story building at 1722 Frederick Ave., containing approximately 10,000 sq ft. for machine shop work.

BALTIMORE—Freeman Metal Products Inc. has been organized to produce, at 3406 O'Donnell St., metal letters and similar products; Louis C. McComas, president.

BALTIMORE—B. Shapiro Co., 818-822 S. Eutaw St., metals reclaiming, is erecting a 4000 sq ft wing to its plant and plans to add a similar addition later.

BALTIMORE—Baltimore Foundry & Machine Corp., Charles & Wells Sts., steel castings, will build a foundry addition. The company is a branch of McConway & Torley Corp., 48th & Dunbar Sts., Pittsburgh; J. F. Flynn is purchasing agent at the local plant.

BALTIMORE—Paramount Co. Inc., manufacturer of chromium furniture, whose plant at 34 E. Montgomery St., containing about 20,000 sq ft, was recently destroyed by fire, has established a temporary plant at 415 N. Exeter St.

MASSACHUSETTS

NEW BEDFORD, MASS.—New Bedford Gas & Light Co., 693 Purchase St., Fall River, Mass., has awarded a $2.5 million contract to Theodore Loranger & Sons, 404 Nash Rd., for construction of a power plant, Cannon St. station extension.

NEW YORK

BROOKLYN, N. Y.—Bartley Realty Corp., 4201-23 Ave. H will spend $115,000 for a 2 story factory alterations, 4123 Ave. H; plans by Seelig & Finkelstein, 153 Pierrepont St.

BUFFALO—Production Steel Coil Co. Inc., Detroit, has acquired stock of Seneca Steel Service Inc., 1050 Military Rd., distributor of sheets, plates and kindred products, and plans to enlarge present facilities in way of inventories, equipment, etc.; negotiations

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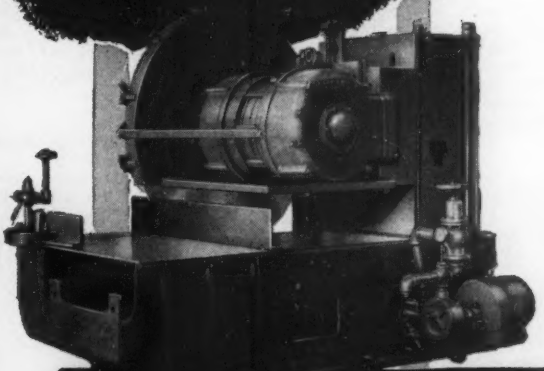
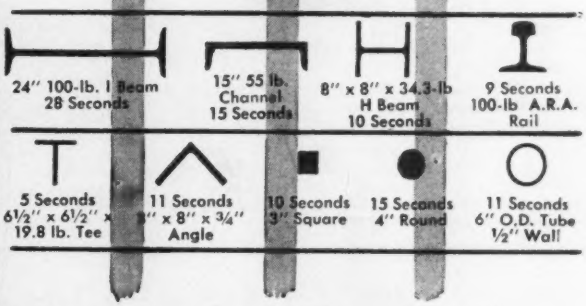
Modern Sawing



with KLING HIGH SPEED FRICTION SAWS



Friction sawing is one of few mechanical processes which employ the heat of friction in a useful manner. It concentrates heat on the material to be severed at a rate which is faster than it can absorb heat. The immediate temperature rise of the contact surface is so great that its strength is reduced considerably lower than that of the colder blade rim. This heated surface is readily removed by the blade and permits complete severing of the material rapidly with no loss of metal from the blade.

Because of its versatile ability to cut many varied structural shapes, as well as solid or hollow bars in any sequence, without change of blade or set-up, one machine can handle a volume of cutting that would otherwise require several separate shears or slow speed saws.

Consult Kling engineers regarding your metal cutting problems. State size of material to be cut. Bulletin No. 9200 giving full particulars and suggestions as to the type and size of saw will be mailed promptly. No obligation.

KLING BROS. *Engineering Works*

Punches; Bar, Angle and Rotary Shears; Combination Shear, Punch and Copers; Plate and Angle Bending Rolls; Heavy Duty Grinders

1328S NORTH KOSTNER AVE., CHICAGO 51, ILLINOIS, U. S. A.

UNIVERSITY OF MICHIGAN LIBRARIES

are under way for erection of plant addition.

OHIO

CLEVELAND—Elton L. Bedford, operator of a nut and bolt welding concern, has incorporated the business under the name of Superior Weld Fastener Co., 74 Hartman St., Berea, O.

MASSILLON, O.—Cleveland Wire Spring Co., with plants at 800 Waynesburg Rd. S. E., Canton, O., and 1281 E. 38th St., Cleveland, is negotiating for a lease on No. 2 plant of Massillon Aluminum Co., First St. S. W., subsidiary of Ekco Products Co., Chicago, which owns the plant.

OKLAHOMA

WITCHER, OKLA. — Peppers Refining Co., First National Bldg., Oklahoma City, Okla., will build a $600,000 natural gasoline plant in Witcher oil field; own forces.

PENNSYLVANIA

ELRAMA, PA.—Duquesne Light Co., 435 Sixth Ave., Pittsburgh, will build a $28 million power station; C. T. Sinclair, c/o owner, chief engineer.

PHILADELPHIA—C. Schmidt & Son Inc. has awarded a $1 million contract to Kuljian Corp., 1518 Walnut St., for construction of a brewhouse.

PHILADELPHIA—George D. Ellis & Sons Inc., 309 N. Third St., will construct a $500,000 factory building, American and Luzerne Sts.; plant will be devoted to manufacture of tin cans, special metal containers, and light metal stampings.

PITTSBURGH—Western Electric, 910 River Ave., will build a $5 million repair plant and warehouse.

PITTSBURGH—Union Railroad, F. R. Smith, chief engineer, East Pittsburgh, will build a $350,000 diesel shop building, Hall Station.

SHAMOKIN, PA.—Commonwealth of Pennsylvania, Harrisburg, Pa., will spend $3 million in additional buildings to house proposed division of heart ailments at Shamokin State Hospital.

SOUTH DAKOTA

NUNDA, S. DAK.—Nunda Co-operative Association will build a $500,000 grain elevator.

TENNESSEE

NASHVILLE, TENN.—State Board of Education, State Office Bldg., will build a $2 million school for blind; plans by Marr & Holman, Stahlman Bldg.

NASHVILLE, TENN.—Guardian Life Insurance Co., c/o Hart, Freeland & Roberts, architect, Third National Bank Bldg., will build a $250,000 warehouse.

TEXAS

DALLAS—Neuhoff Bros., 2821 Alamo St., has awarded a $750,000 contract to Cedric Burgher Construction Co., 3027 Main St., for construction of a meat packing plant.

HOUSTON—Humble Oil & Refining Co., P. O. Box 2180, plans a $155 million investment program of exploration and drilling, improving and increasing general production facilities and constructing new gas plants.

UTAH

SALT LAKE CITY, UTAH—Lundin & May Foundry Co. Inc. plans a $70,000 plant addition.

WASHINGTON

SEATTLE—Ten Co., c/o J. Blume, University Chev. Co., E. 45th St. and Roosevelt Way, will build a $400,000 garage; plans by Naramore, Bain, Brady & Johanson, Dexter Horton Bldg.

SEATTLE—Contracts for 13 construction projects, totaling $15,249,540, under the $65 million Alaska military construction program, have been awarded by United States Engineers. The recent awards are: Fort Richardson: Family quarters, Gothbery Construction Co., Anchorage, $351,430; addition to central power plant, $1,331,225, outside utilities, $1,588,584, Peter Kiewit Sons Co. and Morrison & Knudsen, Seattle. Eilson Air Force Base: Lighting system $703,000, Reed & Martine, Fairbanks; outside utilities $662,400, Fred Wagar, Auburn, Wash.; outside utilities $497,488, Selid Construction Co., Fairbanks; barracks, supply and day rooms $738,985, S. Birch & Sons, Seattle. Whittier: Bulk fuel facilities, including wharf, pipe line and tank farm $2,017,825, Morrison-Knudsen Co. Ladd Air Force Base: Outside facilities, two contracts, $2,260,500 and $1,718,500 respectively, B. & M. Construction Co., Oklahoma City, Okla.; power and heating plant $3,090,000, Peter Kiewit Sons Co.; motor pool warm storage $259,643, Slater & Jacobsen, Fairbanks.

WISCONSIN

MILWAUKEE—Cutler-Hammer Inc., 1391 W. St. Paul Ave., will build a $450,000 toolmaking plant at N. 13th St. and St. Paul Ave.; Eschweiler & Eschweiler, architect; contract awarded to Walter W. Oeflein Inc., general contractor.

WEST ALLIS, WIS.—Wisconsin Electric Power Co., 231 W. Michigan St., Milwaukee, has awarded a $750,000 contract to Thomas H. Bentley & Sons Inc., 4610 W. Mitchell St., for construction of a stores building; Fred A. Luber Jr., c/o owner, architect.

WYOMING

WESTERN AND NIOBRARA COUNTIES, WYO.—Plains Pipe Line Co., Newcastle, Wyo., will spend $1.5 million in oil pipeline serving field in Western and Niobrara counties.

CANADA

ALBERTA—Canadian Pacific Railway, J. E. Armstrong, chief engineer, Windsor Station, Montreal, Que., will construct a $3.5 million railway line from Ford-Highwood Collieries to Okotoko, Alberta.

KETCHIKAN, B. C.—American Viscose Co., Wards Cove, has awarded a $30 million contract to Morrison Knudsen Co. Inc., 319 Broadway, Boise, Idaho, for construction of a wood pulp mill.

LITTLE CANYON, B. C.—British Columbia Power Commission, 918 Government St., Victoria, B. C., will build a $5.5 million power development on Quesnel river.

SHERBROOKE, QUE.—E. Gagnon, 3999 Bivard St., Montreal, Que., will build a $1 million plant; plans by J. Damphousse, 937 Laurier Ave., Montreal.

PRICES OF LEADING FERROALLOY PRODUCTS

(*Continued from Page* 155)

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots, 2" x D, $1.40 per lb of contained Ti; less ton $1.45, (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lot $1.28, less ton $1.35. F.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract, $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6, 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

TUNGSTEN ALLOYS

Ferrotungsten: (W 70-80%). Contract, 10,000 lb W, or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W., $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $6.25 per lb contained B, f.o.b. Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max, C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.25c, less ton 18.5. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 16.50-17.00c per lb of alloy; ton lots 17.90-18.00c; less ton lots 19.40-19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Packed, lump, carload 11c, ton lots 11.25c, smaller lots 11.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base): Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.